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THE AUTOMOBILE

Many New Features at Olympia Show

GENERAL VIEW OF THE INTERIOR OF THE TENTH ANNUAL AUTOMOBILE SHOW AT OLYMPIA

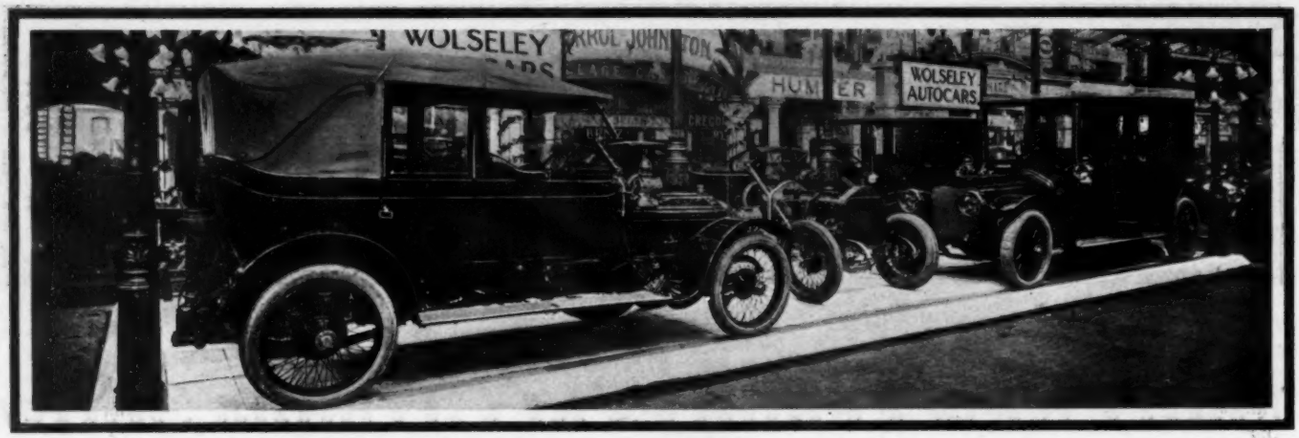
LONDON, Nov. 3.—John Bull opened his tenth annual automobile exhibition to-day at Olympia, a hall almost as cramped as the Grand Central Palace, without that building's advantage of central location. Britain's free trade policy has made the London exhibition the only international one in the world, for in addition to the home products it brings together the best from France, Germany and Italy, and a certain amount of American representation. It would perhaps be more correct to say that it attempts to bring together the automobile product of the whole world, for, the hall being altogether too small for requirements, numbers of makes are crowded out, and among those having applied in vain for admission are at least half a dozen American concerns most recently introduced to the European market.

As was to be expected, the question of obtaining a substitute for poppet-valves is being given a large amount of attention by the engineers of all European countries, and out of the mass of schemes submitted by enthusiastic inventors to level-headed business managers three have survived. In the background are many more almost ripe for public presentation, and many of them will doubtless come forth at no distant date.

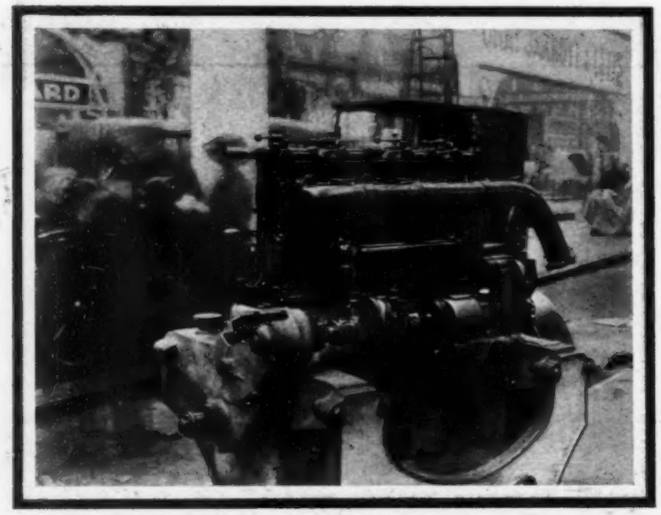
The three new systems are the Henriot rotary valve adopted by Darracq for one model of car only; the single sleeve valve taken up by the Argyll Company, and a rotary valve by the Itala concern. It is worth noting that in all three cases the rotary or sleeve-valve motors are being produced concurrently with poppet-valve types.

The Henriot is the most familiar of the three, for it has been exhibited by the inventor at earlier shows in Paris and demonstrated by him on cars during the past two years.

The Argyll motor has a single sleeve with a combined rotary and reciprocating motion within the cylinder. In other words



The Wolseley stand at Olympia was representative of one of Britain's foremost factories



New Silent Knight Minerva motor with magneto and water pump at side

it describes an ellipse during two complete revolutions of the crankshaft. The idea is one which has been seized upon by a number of inventors, for Da Costa, in Paris, produced a motor of this type, but abandoned it for a single rotary sleeve after experiencing considerable difficulty in finding a good driving system. Also, it is a strange coincidence that while the Argyll people were working on their sleeve-valve motor, the Piccard-Pictet engineers in Geneva were at work on an almost identical design. When the Swiss applied for patents in England they found that they had been forestalled by Argyll, and when the Scotchmen made application on the Continent they discovered someone already in possession. The outcome was a compromise, each firm having rights in its own country.

The single sleeve of the Argyll is about 1-8-inch thick, naturally ground inside and out, and carries at its base a lug to which is attached a vertically pivoted pin and a small face block. At right angles to the pin is a spindle having a bearing in a gear wheel, this letter meshing with a pinion on a lay shaft driven at motor speed by means of a silent chain in the fore portion of the engine base. The inventor has made use of five ports in the sleeve and six in the cylinder, one of the port sleeves doing service for both an inlet and an exhaust port in the cylinder. The valve ports are not cut rectangular, but to a duplicated curve in order to assure the quickest possible opening and closing. As in the Knight system, a separate head is employed; it carries a broad junk ring and a narrow piston ring, all of them being pinned to prevent turning.

Two important features are that at the moment of explosion all the ports in the sleeve are protected behind the extended head; further, after the passage of the exhaust gases the ports in the sleeves immediately pass to a waterjacketed portion of the cylinder walls. Lubrication has been thoroughly provided for by means of a force-feed system to all main bearings, troughs for the connecting-rod ends, and separate leads to each of the sleeve-operating mechanisms. The motor, which has a 25-horsepower rating, has its cylinders cast in two pairs.

The new Itala, which is a four-cylinder of 105 by 150 mm. bore and stroke, makes use of one pair of rotary valves for the four cylinders, each valve of course performing the necessary functions for the two cylinders cast together. On each casting is an outstanding cylindrical casing having an internal diameter of 4 inches, and within each of these cylindrical casings are two ports ¾-inch wide by 3 inches in length through which the charge passes to the respective cylinders and the spent gases are liberated. The distributor valve is provided with three sets of rings, one at the base, one set on the upper portion of the body of the distributor and the third set on the end of the upper extension. The distributor valves revolve at one-quarter motor speed, the ports in the distributor being duplicated so that alternate inlet charges and alternate exhaust charges come in contact with a given port in the rotary valve. The ports in the distributor are so arranged as to lead the exhaust gases from the cylinder port up the rotary valve and out through the head into the exhaust manifold. The fresh gases pass in from the base of the valve directly into the combustion chamber. The exhaust ports in the rotary valve are cut about 30 per cent. greater area than the intake ports. As difficulties might be expected with overheating in a valve fulfilling the two functions, the designer has very cleverly cored the valve itself so as to provide as efficient a circulation of water through it as around the cylinder walls. Driving of the rotary valves is obtained by means of two vertical spindles—one for each valve and for each pair of cylinders—with spiral gearing from a horizontal shaft in the position of the usual camshaft. It is from this shaft that drive is transmitted to a central transverse shaft having the water pump on the right and the magneto on the left. Provision has been made for a possible seizure of the rotary by the use of a safety coupling with undercut tongues which can be sheared off in case of any unusual resistance. On the base of the driving spindle is an Oldham coupling having a brass ring with two full and two under-cut dogs, these latter capable of being sheared if seizure takes place. A fresh ring can be fitted into position in place of the damaged one.

The Knight Motor Is Prominent

The Knight motor has made further progress, for while being continued by the Daimler Company for all models, Panhard now produces a smaller type of 80 by 130 mm. bore and stroke, the B. S. A. Company has taken it up for a cheap car, the Rover Company employs it, and the Deasy concern is making use of it for one model; and Giradot, of C. G. V. fame, is to use it in 2,000 cars for the coming season.

Important among the new tendencies is the unit type of construction for motor, clutch and gearbox, generally combined

with three-point suspensions. The idea is old, but it is one which has never caught on in Europe until the present season. Now the lead has been taken by the Panhard, which has built the new Knight chassis on these lines, the motor being attached to the frame members by two hangers, and the rear suspension being to a transverse frame member. Another important convert is the De Dion, which has adopted unit construction and three-point suspension for two new light cars having one and two cylinders respectively. Several less important firms have taken up this type of construction.

Monobloc Cylinders Are the Rule

The tendency is more and more towards monobloc casting for large motors having four or six cylinders. There appeared to be only one example of a motor with separately cast cylinders with a five-bearing crankshaft, this being on a little known English car. In the matter of monobloc casting the Continental manufacturers have certainly secured a lead on their English rivals; indeed clean-cut appearance and general accessibility is far more pronounced on the generality of the foreign than on the average home product. Combined with this tendency towards monobloc castings is the use of thermo-syphon water circulation for models of the largest size. It has been common to use thermo-syphon for the small cars and pump circulation for motors having 4 inches bore or more. Now, however, it is being extended to cars of unlimited power, and in addition to the Renault, which has always led in this direction, thermo-syphon cooling is being adopted by the Darracq, Charron, and Delage for motors developing as high as 60 horse-power.

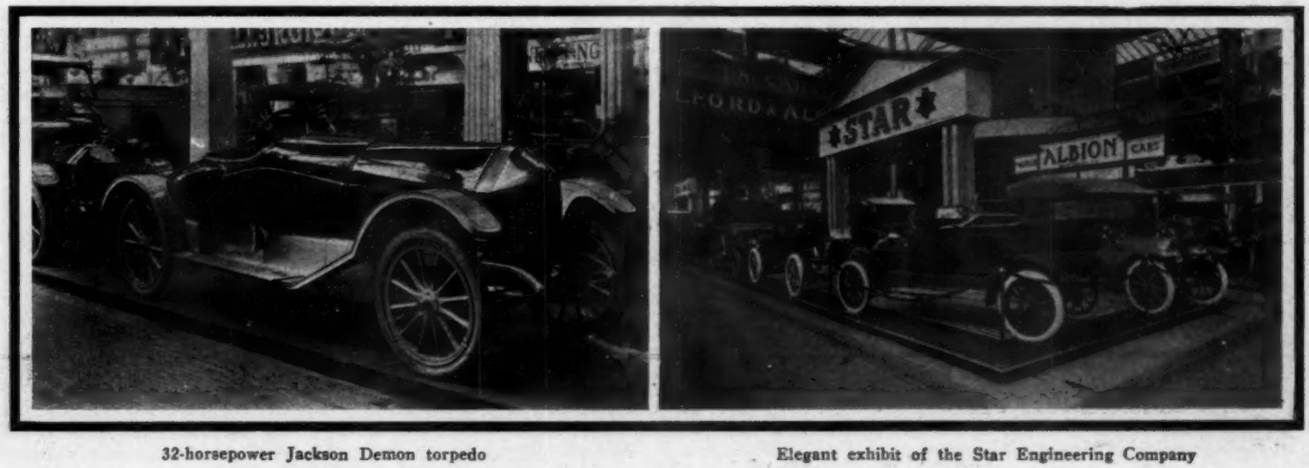
The coming system of lubrication in Europe is of the force-feed type, the base of the crank chamber forming an oil tank from which the lubricant is drawn by a pump and delivered to the main bearings and through the bored crankshaft to the connecting-rod ends. At least a score of firms could be mentioned which have taken up this system with various detail modifications. Apparently difficulty has been experienced in certain cases in forcing oil right through a two-bearing crankshaft for a four-cylinder motor, or from the center bearings of a six-cylinder motor to the more distant connecting-rod ends. This has led, in the case of the Chenard-Walker motors, to the bolting of light aluminum casings having a semicircular oil lead onto the two inner webs of the crankshaft; thus the shaft is only bored through from the two main bearings to the two outer connecting-rods, the flow from these two points being through the bolted-on oil leads. Where a three-bearing crankshaft is employed the favorite method is similar to that employed on the new Panhard-Knight, where the oil is delivered direct to the three bearings and distributed through the shaft from the end bearings to the two outer connecting-rod ends, and from the center bearing to the two central connecting-rod ends. The only other system which is receiving any considerable amount of favor is force-feed to the main bearings and troughs with dippers for the connecting-rod ends. It avoids the necessity of boring the mainshaft, but it is a system which will doubtless have to give way before force-feed throughout. A few makers have retained splash on the plea of simplicity, and on the Charron the flow from the tank on the dashboard is connected up to the accelerator pedal, so that the amount of drip is in proportion to the extent that the accelerator pedal is depressed. The arrangement is neatly carried out, for the oil tank is built into the same casing as the gasoline tank on the dash, and the interconnecting mechanism is within a dummy portion of the tank on the extreme right-hand side.

Chain drive for the camshaft has not yet ousted pinions, but it appears to be in a fair way of doing so, for one or two chains are being used on nearly half the motors exhibited. It has now been found, however, that provision must be made for taking up slack, and this is being done either by means of an idler pinion mounted on an eccentric or by means of an eccentric mounting for the magneto shaft, where the motor has one chain only for cam and magneto shafts.

There is little that is new in ignition devices, the high-tension magneto reigning supreme. Even the preference shown by the English for a secondary ignition as a standby has now disappeared, apparently being satisfied by the dual ignition on one set of plugs. A beginning is shown towards the adoption of dual high-tension ignition firing two plugs simultaneously in one cylinder. This has been adopted for some time on racing cars, but is only just beginning to make its appearance on touring models.

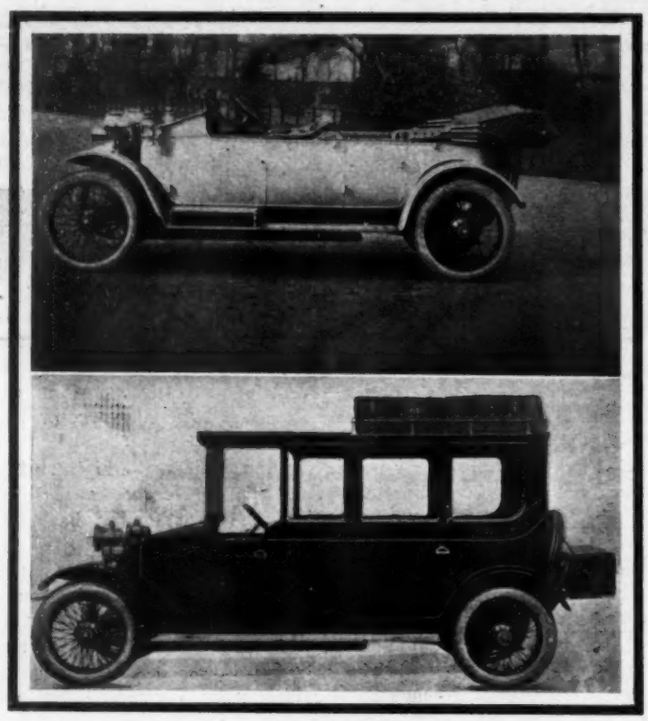
The three-speed gearboxes which were formerly fitted on most of the small and medium powered cars are having to give place to four speeds with gate change. There are very few cars, now, of whatever power, which are not provided with four forward speeds, while those French manufacturers who clung to the straight-through type of sector have been obliged to fit a selective type to meet the requirements of the English market.

Where the Fiat held forth at Olympia



32-horsepower Jackson Demon torpedo

Elegant exhibit of the Star Engineering Company



Two types of body construction shown at Olympia by the Lanchester Company

Notably among those having made this change is the Delaunay-Belleville Company. Chain driven gearboxes have been promised and indeed are used in France by Aries, and in London by the General Omnibus Company, but they have made their appearance on only two makes of touring cars, both of British construction. Final drive by worm gearing remains an English idea, at least half a dozen firms having taken it up, whereas in France Darracq is its only producer. Even in this case the change has been made more with a view to meeting English than French requirements.

A novelty in brake construction is shown by the La Buire Company in the form of a foot-brake on an extension of the propeller shaft. The shaft passes right through the differential housing and it is on the projecting extremity that the additional brake is mounted. The Argyll Company, on its new sleeve-valve model, brakes on all four wheels diagonally, a rear wheel on one side and a front wheel on the opposite side being operated together.

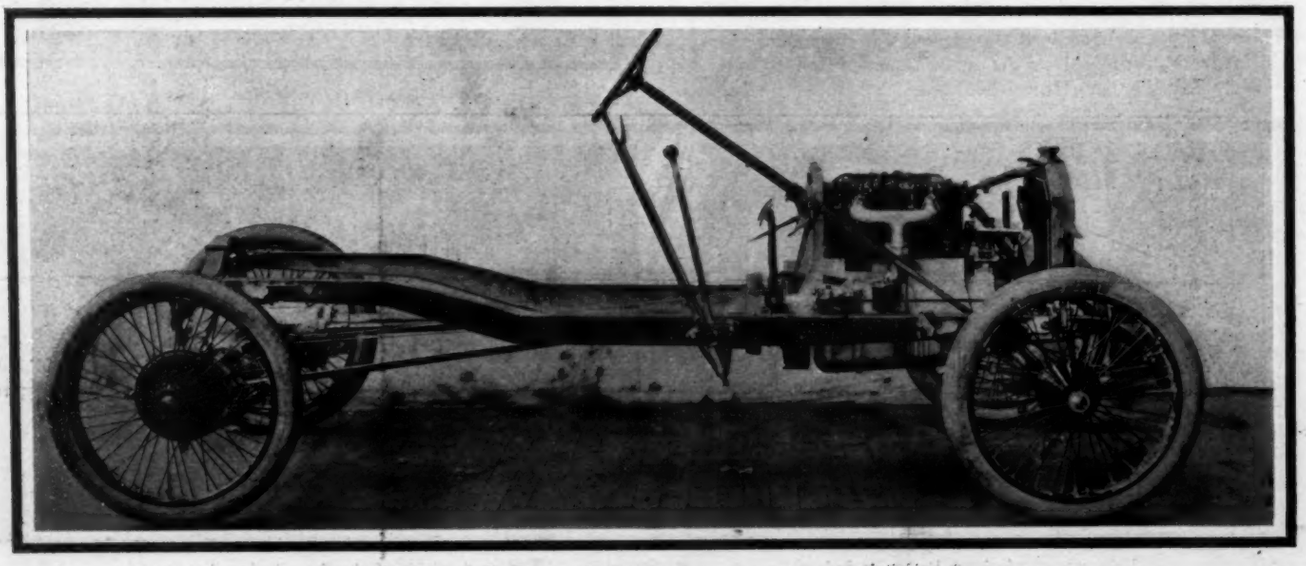
A Review of the Design

A GREAT number of American firms are not to be seen within the big hall or its annex, owing to the fact that their membership is not yet one year old. The United International Motors, Ltd., which has started on a big scale to sell Maxwell and Stoddard cars in the United Kingdom, has found itself outside the pale. Amongst others the Cameron air-cooled car, the Mitchell, the Hudson, the Krit, the Flanders, the E. M. F. have also failed to get a place in the exhibition. The chief American cars on show are the White, the Cadillac, the Overland, the Buick, the Hupmobile and the Ford, to which perhaps one or two may be added after a closer inspection of all the stands. Of course an attempt has been made to make capital out of this exclusion of so many American agents, the suggestion being made that the society has desired to throw obstacles in the way of those who are putting on the English market cars of a price with which English manufacturers find it difficult to compete. That there is no foundation for this rumor is evident from the fact that English people have also been excluded, together with even such an important firm as the Zenith Carbureter Company, which is supplying carbureters to a very great number of leading manufacturers.

This year at Olympia there is scarcely a single car of merit that has not abandoned spur gear for driving the accessories of the engine.

The magneto and water pump, if these are not driven directly off the camshaft, are operated by silent chains or worm-gear. In fact, this is the most noticeable tendency in the whole of the exhibition. One firm has gone even to the length of introducing a gearbox in which the changes of speed are obtained by silent chains. This firm is the Maudslay, which has always been remarkable for the pains it has taken to give great accessibility as well as science. It is a firm with fine traditions, having been well known in the forties and fifties of the last century for its steam engines, examples of which may be found in mechanical museums all over the world.

There seems little unanimity about the worm-driven back axle which was brought to the front last year. It has been used by Lanchester and by Dennis for a number of years, but they were alone until the Show of 1910, when the Daimler Company with several others decided to adopt it. This year it has found some new adherents, but one or two of the firms who spoke so highly of it last year are now quietly dropping it. Its great merits were said to be silence and ease of fitting. The bevel gear is certainly inclined to produce chattering besides



Chassis of the low-priced car with Knight motor put out by the R. S. A. Company

Tendencies at Olympia

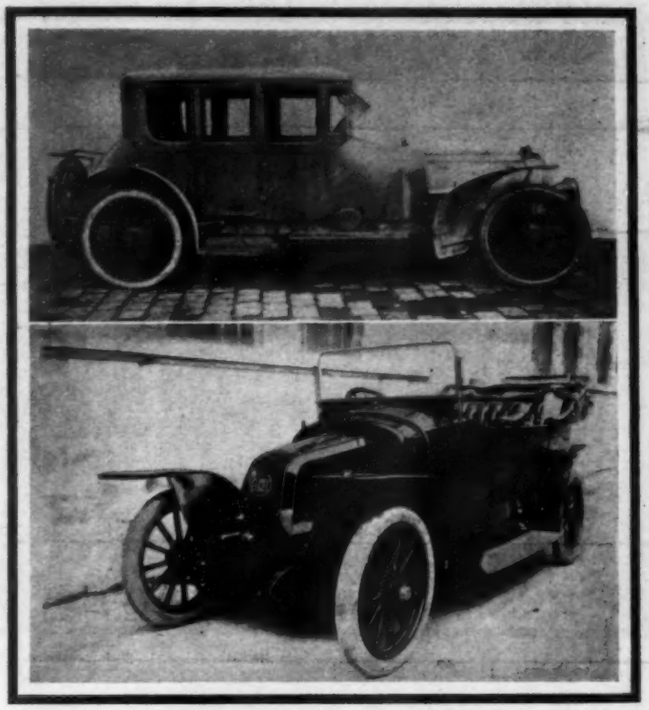
humming, whereas the worm drive is indeed really silent. It is now said by one or two manufacturers that the bevel drive is far superior in hilly districts, and they advise customers not to have worm drive if the car is likely to be called upon to do very much hill climbing. In this year's exhibition there are firms using both worm drive and bevel drive.

Front brakes appear to be losing favor, after having been introduced with a rush about two years ago. The fault seems to lie not with the principle, but with the design, because the firms that have the best designs are still fitting the front brakes. The Argyll has introduced them on its new 25-horsepower sleeve-valve model, and in this case the front and rear brakes are diagonally cross-connected for the purpose of preventing the tendency towards side slipping which is sometimes shown by cars with front wheel brakes. In the matter of brakes the best innovation stands to the credit of the La Buire car, on which the drum of the foot-brake is found at the rear of the differential casing. It is mounted on an extension of the bevel shaft, and of course in this position no brake-stresses are transmitted through the universal joints. This seems a very logical position for the front brake to occupy.

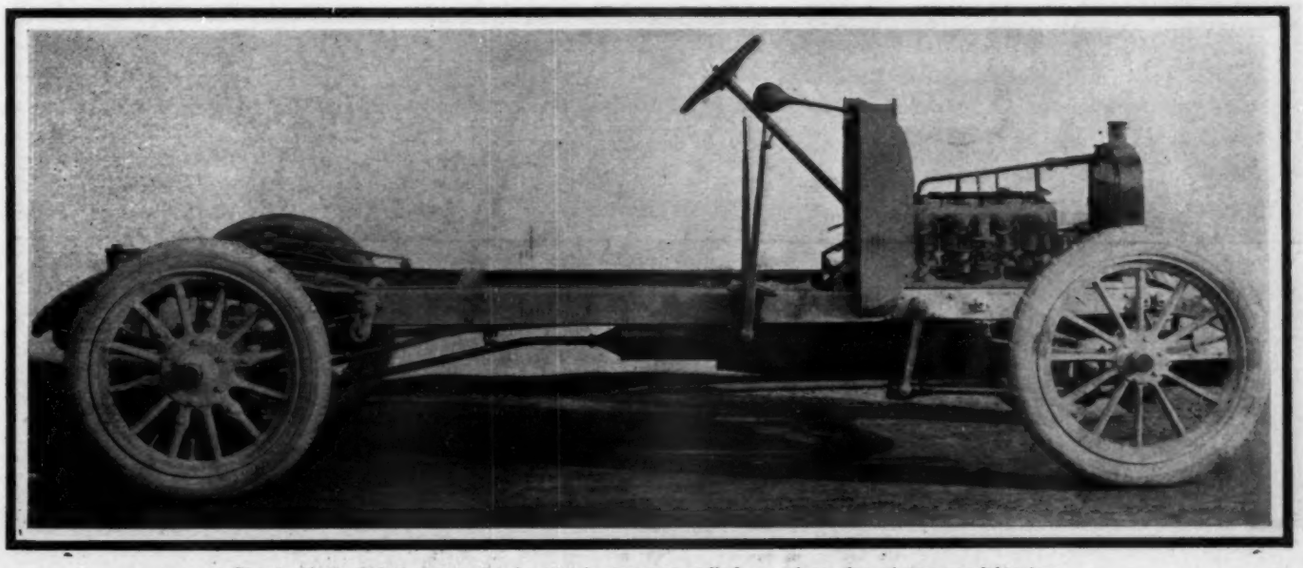
Six-cylinder motors have settled down on a rational basis. They are supplied by most firms if a car of fairly high power is demanded. The only firm which was manufacturing a really small-powered six-cylinder car has dropped the model for this year. Delaunay-Belleville has a six-cylinder car of a nominal 10 horsepower, but this year its smallest six-cylinder model is nominally 19 horsepower. The fashion set by the Rolls-Royce to cast the cylinders in two sets of three is now being copied by the best makers of six-cylinder cars. Exactly what the benefit is does not appear to be very clear. Quite a new idea is the vibration damper to be found on the Daimler and Deasy cars. At certain critical speeds the engine tends to cause noticeable vibration, the cause of which has been discovered to be the length of the crankshaft. The addition of the damper, which is something in the nature of a slipping clutch arrangement, has been found to keep the engine running smoothly over its whole range of speed. These dampers are fitted at the forward end of the crankshaft.

It may be stated that the long-stroke engine is finding favor. The longest strokes are found in the cars produced by firms which have had racing experience. This feature now has additional importance in England owing to the sliding scale of taxation being based upon the horsepower rating, which is reckoned entirely by cylinder bore. The classes that have been introduced for taxation are now plainly governing the choice of cylinder bores. Thus one finds 11.9-horsepower cars in fair numbers, these just escaping the 12-horsepower tax. Similarly, a big number of 15.9-horsepower models have been introduced to escape the 16-horsepower tax. This is a point which American manufacturers should bear in mind. The assembling of engine clutch and gearbox in one unit has found a few more adherents, and the enclosed valve gear has become much more popular.

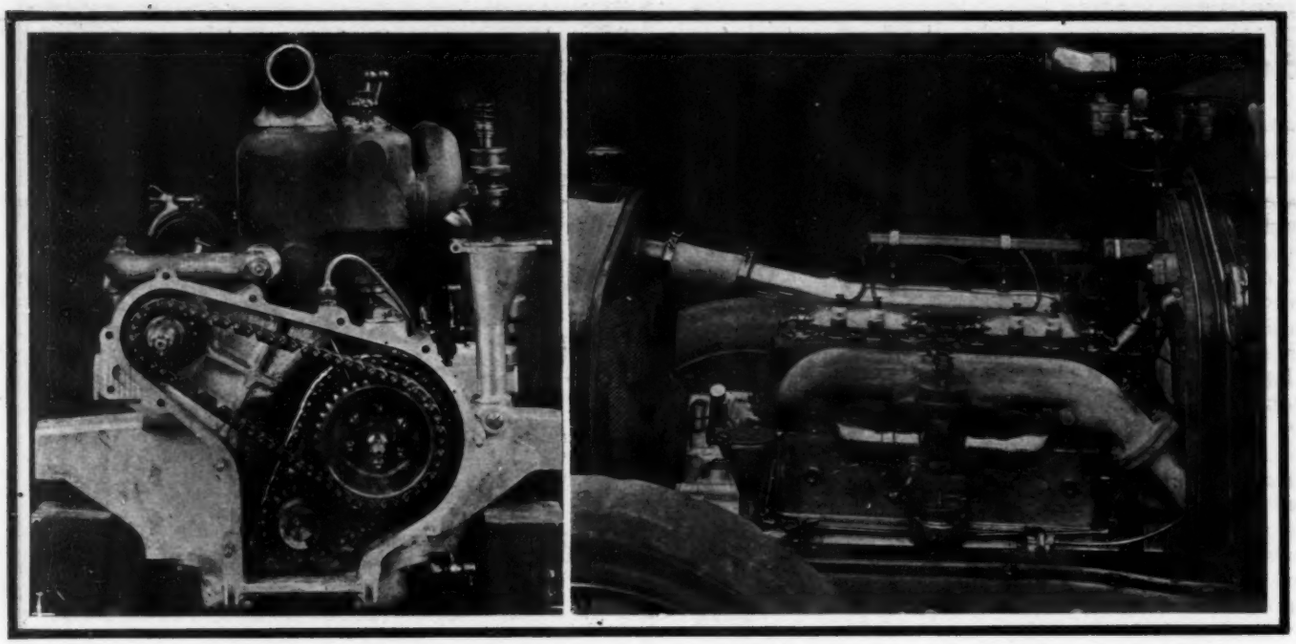
Only the Cadillac car has been added to the list of models which fit a self-starter. The Cadillac system is at present unique, being operated electrically, whereas all other models of self-starters operate by compressed air. Some firms like the Belleville, Seat and Enfield now make provision for the fitting of compressed-air self-starters, but are not supplying the parts as standard equipment. In addition to a service of compressed air for tire inflation, as well as for engine starting,



Delaunay-Belleville with inside-steering body
Darracq touring car with rotary valve motor



Chassis of the 15-horsepower Austin, showing separate cylinders and cased-in change-speed bracket



Two views of the Wolseley 16-20-horsepower engine, one showing the gear cover removed

one or two manufacturers are arranging for the use of pneumatic jacks.

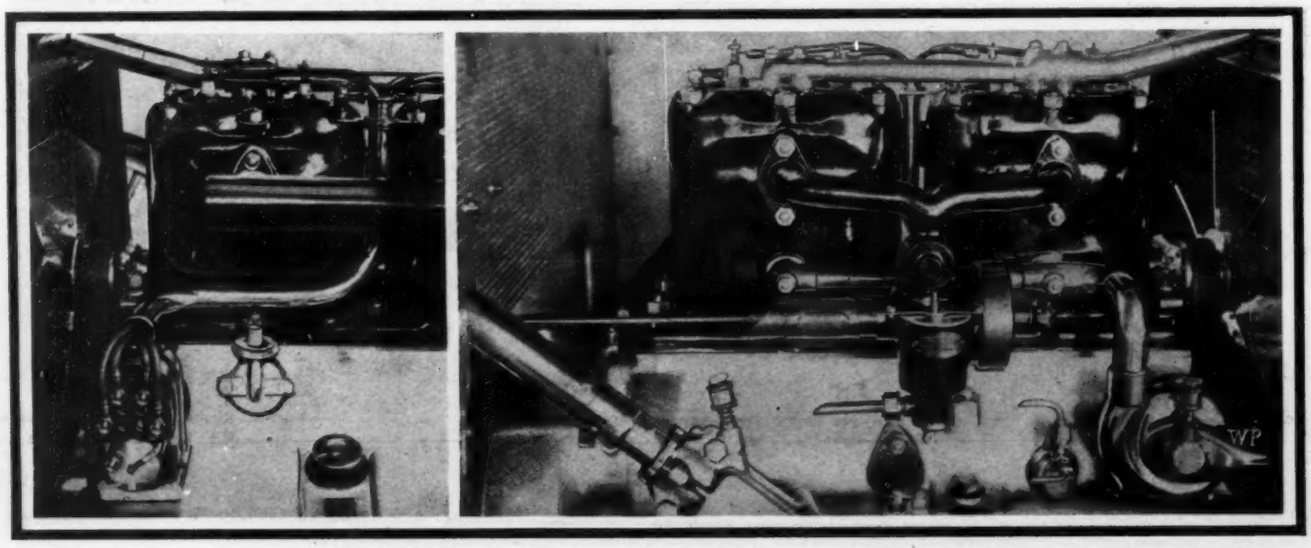
On some of the cheaper cars wire wheels of the fixed pattern have been adopted. A very noticeable movement towards four-speed gearboxes on cars of small and moderate power is seen at this show. And if one adds that still a few more manufacturers have gone over to the plate clutch one completes a review of the general tendencies that are to be noted in the design of cars at the Olympia exhibition.

Some Features of the Small Panhard

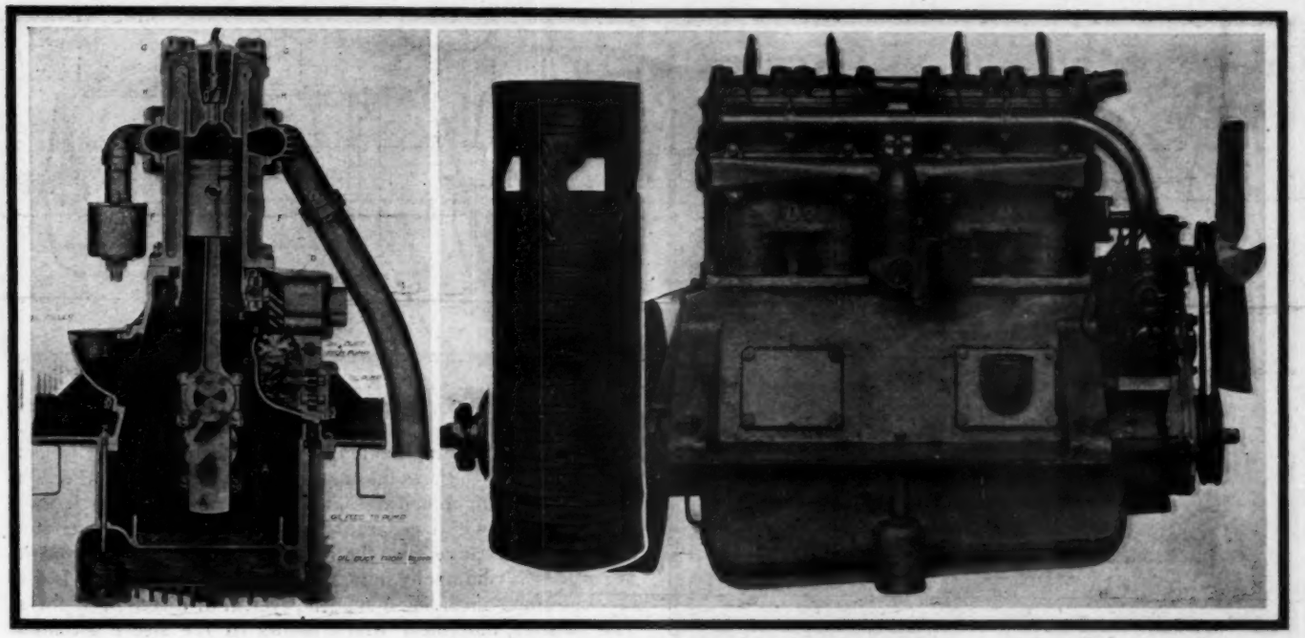
For the 1912 season the Panhard Levassor Company will produce two models with the Knight sleeve-valve motor, the four-cylinder of 100 by 140 and a smaller model having four cylinders of 80 by 130 millimeters (3.1 by 5.1 ins.) This is the most popular size of motor in Europe at the present time, and with the introduction of this model almost half the Panhard output will consist of Knight motors. A poppet-valve motor of the same bore is already manufactured, but the new Knight is not intended to replace this, and is indeed an entirely new chassis, departing in many important respects from previous Panhard design. The motor has its four cylinders cast in pairs, and is on the unit principle, the motor, clutch and gearbox forming a single bloc with three-point suspension. The crankshaft is carried on three plain bearings, while the chain, instead of being in a separate housing at the front of the motor, is now removed to the rear.

As on the larger Knight motor, a transverse shaft at the front of the motor drives the magneto on the left and the water pump on the right. An important change has been made in the lubrication of the motor; instead of a circulating system, the base of the crank chamber forms an oil sump from which the lubricant is drawn by a pump working off the eccentric shaft and delivered to the three main bearings, then through the bored shaft to the connecting-rod ends. The shaft is not bored throughout, but the oil delivered to the central bearing is carried through to two connecting-rod ends; the lead from the end bearings is through to the outer connecting-rod ends.

The clutch and gearset are within a separate housing independent of the crank chamber, yet bolted to it in order to form one bloc, the whole unit being attached to the frame by two hangers about level with the rear of the second cylinder and



Showing some of the details of the small Panhard engine with Knight sleeve valves



Vertical section and side view of the Argyll single-sleeve motor

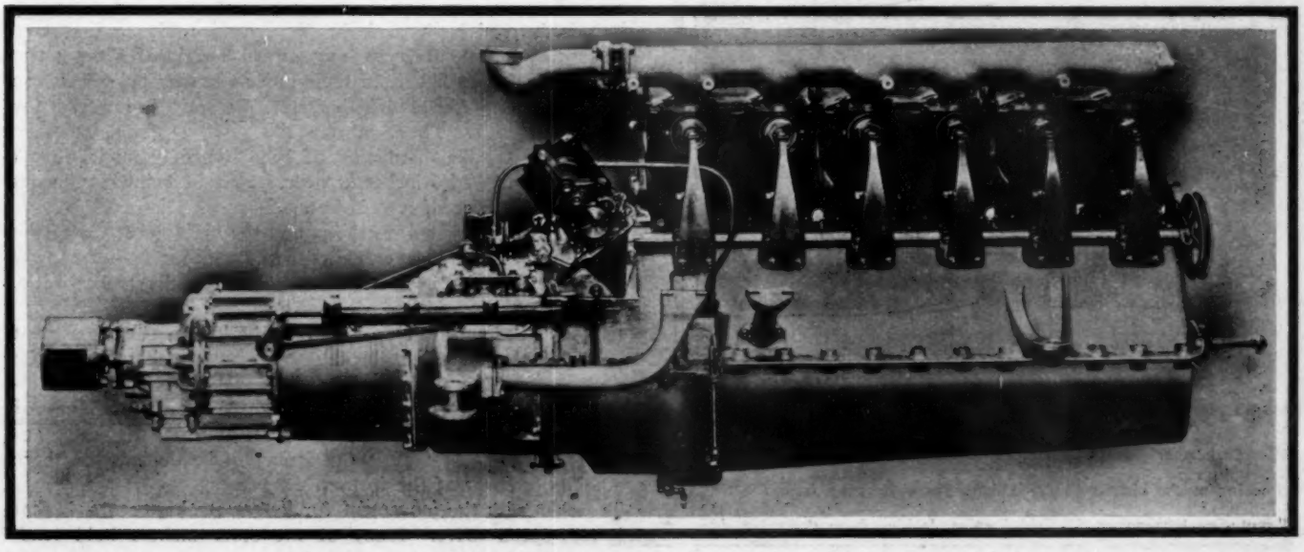
at the rear of the gearbox to a double channel-section transverse member. Hitherto Panhard clutches have been either cone or multiple discs; on this model a plate clutch is used, the surfaces being fibre and steel. The gearbox gives four speeds with two sliding sets of gears operated by a straight-through sector and a cam mechanism within the gearbox, as on some of the firm's trucks. Clutch and gear housing come under the footboards, and on the top of the housing are two large inspection plates, each one held down by a single screw. Final drive is by propeller shaft with bevel gearing, the shaft being carried in a torque tube, and the tube stayed triangularly from a point one-third from the rear to a point under the spring seating. The rear axle is also a new design, the housing being formed of two tapered tubes bolted to the halves of the vertically divided differential housing. The rear axle is not trussed in any way. The abolition of the independent gearbox has carried with it the disappearance of the transmission brake. All braking is now done on the rear wheels, there being two expanding shoes side by side within each drum, one pair being operated by pedal and the other by the side lever with connection made by steel ribbons guided through fiber rollers.

The Argyll Single-Sleeve Valve Engine

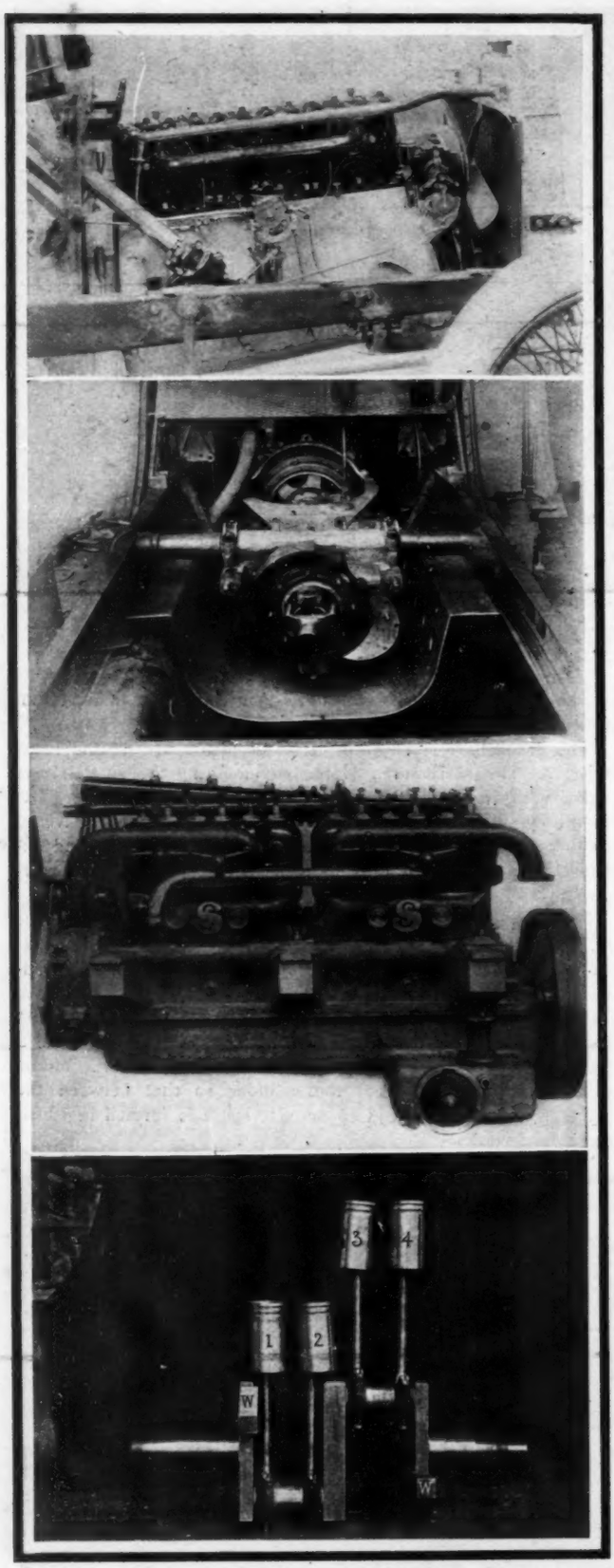
The main difference between the Argyll and the Knight motors is that the former uses one sleeve and the latter two.

The crankshaft, connecting rod and piston are of the usual type; the special features of the engine being the single-sleeve valve with its specially shaped ports, the corresponding ports in the cylinder, and the mechanism for operating this valve so as to control the opening and closing of the admission and exhaust ports. As usual in four-stroke engines the valve is operated at half the engine speed.

In the cylinder there are six ports, three on each side, those on one side being exhaust ports and those on the other admission ports. In the sleeve there are five ports, two being admission and two exhaust, the odd port acting alternately as an admission and exhaust port. The cylinder is closed at the top end by means of the head, which may be described as a fixed piston, this piston being the same diameter as the motor piston and projecting into the cylinder so that between the cylinder wall and the head an annular space is formed in which the sleeve works.



38-horsepower six-cylinder Lanchester power unit comprising engine, gearbox and brake

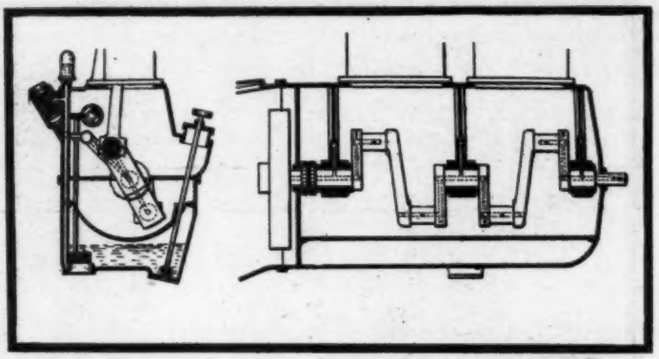


Carbureter side of 30-horsepower six-cylinder Daimler motor

Looking at the chassis of the 15-horsepower Crossley from the rear

Twenty-five horsepower Sheffield-Simplex, looking from the valve side

Two-throw crankshaft used on Sizaire-Naudin long-stroke motor



Lubricating system on Panhard 15-horsepower with Knight motor

The peculiar twisting motion of the sleeve of the Argyll motor may be likened to screwing a plug into a plain hole, where, by twisting the plug round, and at the same time pushing it in, it can be entered with comparative ease. On account of the twisting motion, which reduces the resistance, the sleeve never comes to rest, but is continually in motion in one direction; there is thus no dead center involving a sudden reversal of direction of travel. The twisting movement which allows of the sleeve ascending and descending by different paths, provides for a natural lubricating motion, spreading the oil over the entire surfaces with which which the sleeves come in contact. It is impossible for a sleeve to seize, as even if the lubricating oil were cut off entirely the first thing to seize would be a piston or a bearing, and so efficient and reliable has the method of lubrication proved to be that this state of affairs is impossible except through gross carelessness or neglect.

When, after years of service have so worn the pistons and the insides of the sleeves that they require renewing, all that is necessary is a new sleeve valve and a standard piston, and as the sleeve and the parts therein are ground and cut accurately to standard, no fitting is required.

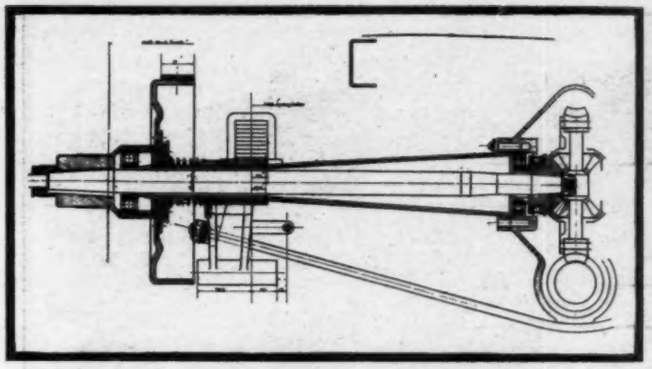
Long Stroke and Four Speeds Popular in England

The ratio of bore to stroke of British-built cars varies widely. Few of the makers appear to favor a cylinder diameter of less than 3 inches. Some of them, however, are putting out models around 12 horsepower with bores slightly under this figure. For motors of this size, the tendency is toward a stroke around 4 3-4 inches, although the 10-horsepower Austin, with a 2 1-2-inch bore, has a stroke of 3 1-2 inches. Most of the leading models have the long-stroke motor, as already stated. The ratio is seen to be considerably greater than 1, in most cases, with the exception of a single model—that of the New Engine Motor Company. The leading makers seem to lean toward a ratio of about 1.5 to 1, or even a larger figure, in their models having bores between 3 and 4 inches. Above this diameter, the ratio is lower, being around 1.25 to 1. The Sunbeam six, rated at from 25 to 30 horsepower, has the distinction of being the only model in the list with a stroke of 6 inches or over, its stroke being 6.31 inches with the small bore of 3.56 inches.

Few of the cars listed can be put in the high-power class; the Napier makers, however, exhibited a six-cylinder, 65-horsepower machine with a bore of 4 inches and a 5-inch stroke; ratio, 1.25.

Although the worm drive appears to be losing ground, a great number of the models still cling to it, among these being the Daimler, Maudslay and Rover. Others make it an optional feature, while still others specify bevel drive on all machines of their make. In the matter of numbers, at least, the latter appears to have the best of it, but it cannot be denied that there are points in favor of the former.

Together with the movement for longer stroke motors, is that for four-speed drive. Many of the older makers hold tenaciously to the three-speed type, but it would seem that they must

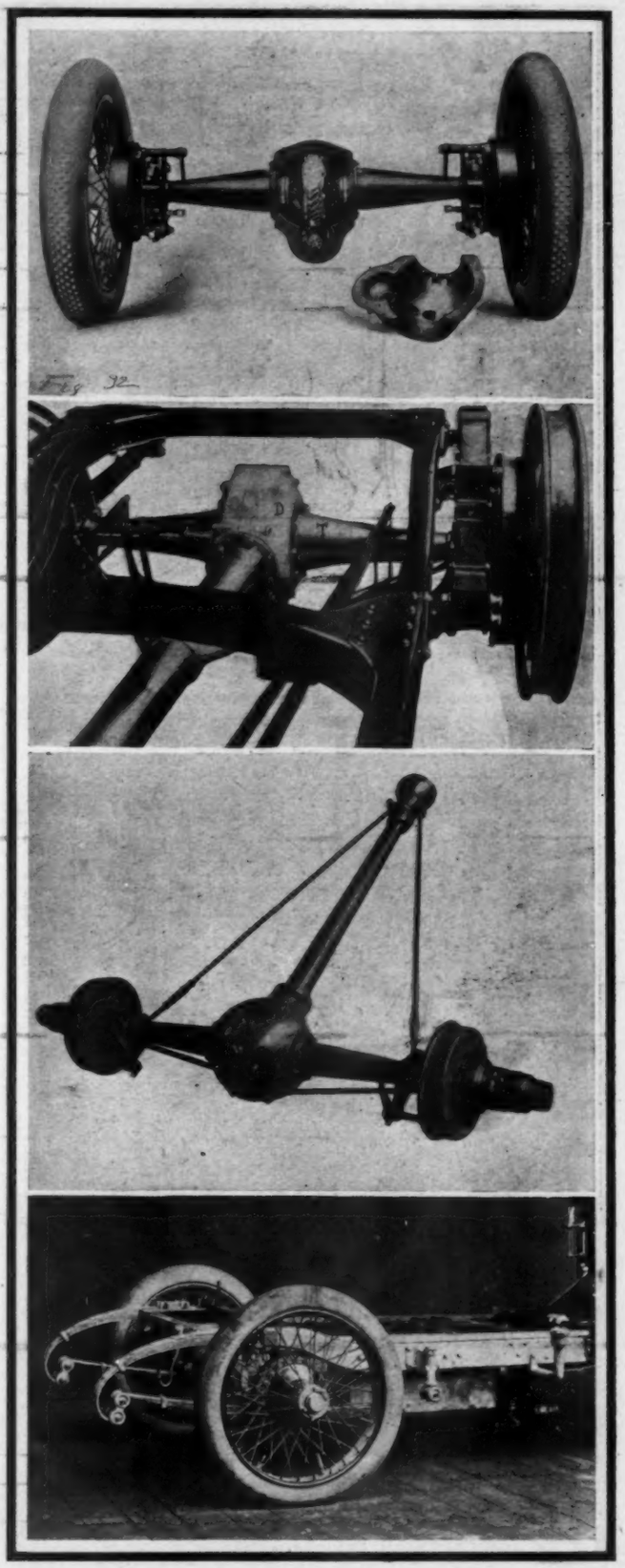


Rear axle arrangement used on the 20 and 30-horsepower Daimlers

all come to it in time. Conspicuous among those who still adhere to the three-speed drive are the Rolls Royce, Ltd., the Daimler Motor Co., Ltd., and S. F. Edge, Ltd. (manufacturer of the Napier). The writer is not familiar with the arguments for or against either drive, but, from the number of makers using the four-speed type, it is evidently fast gaining ground.

The following table will show at a glance the principal mechanical data of the better-known English cars:

NAME	No. Cyl.	Bore Inches	Stroke Inches	Bore Stroke Ratio	Horse-power	Drive	Speeds
Adams	6	3.47	4.75	1.37	30	Bevel	4
Albion	4	3.13	5.00	1.61	15	Worm	3
Argyll's Limited	4	2.81	3.94	1.42	12	Worm	4
Argyll's Limited	4	3.56	5.50	1.55	20	Bevel	4
Argyll's Limited	4	4.00	5.13	1.28	25	Worm	4
Armstrong, Whitworth & Co.	4	3.16	5.31	1.68	15.9	Bev'l or Worm	4
Armstrong, Whitworth & Co.	4	3.75	4.72	1.25	22.5	Bevel	4
Armstrong, Whitworth & Co.	4	3.56	5.31	1.49	30	Spiral Bevel	4
Austin	4	2.50	3.50	1.40	10	Bevel	3
Austin	4	4.38	5.00	1.14	18–24	Bevel	4
Austin	6	4.38	5.00	1.14	50	Bevel	4
Belsize	4	2.72	5.13	1.89	10–12	Worm	3
Belsize	6	3.69	4.75	1.29	18–22	Bev'l or Worm	4
B. S. A	4	2.94	4.50	1.53	14	Worm	4
Clement	2	4.03	4.38	1.09	10–12	Bevel	3
Clement	4	4.03	4.38	1.09	18–28	Bevel	4
Clement	4	4.22	5.13	1.22	25–35	Bevel	4
Clement Talbot	4	3.16	4.72	1.49	12	Bevel	4
Clement Talbot	6	3.16	4.72	1.49	20	Bevel	4
Clement Talbot	4	4.00	5.50	1.37	25	Bevel	4
Crossley	4	4.00	5.50	1.37	20	Bevel	4
Daimler	4	3.16	5.13	1.63	15	Worm	3
Daimler	6	3.16	5.13	1.63	23	Worm	3
Daimler	4	4.88	5.13	1.05	38	Worm	3
Daimler	6	4.00	5.13	1.29	38	Worm	4
Deasy	4	2.97	4.34	1.46	12	Worm	4
Deasy	4	3.56	5.13	1.44	18–24	Worm	4
Deasy	6	3.56	5.13	1.44	24–30	Worm	4
Dennis	4	3.56	4.34	1.22	18	Worm	4
Dennis	4	3.94	5.13	1.30	40	Worm	4
Enfield	2	3.75	4.50	1.20	10	Bevel	4
Enfield	4	3.38	4.25	1.26	14–16	Bevel	4
Enfield	4	3.94	4.53	1.15	20	Bevel	4
Humber	4	2.69	4.75	1.77	11	Bevel	3
Humber	4	3.56	4.75	1.33	20	Worm	4
Humber	4	4.13	5.13	1.24	28	Bevel	4
Lanchester	6	4.00	4.00	1.00	38	Worm	3
Maudslay	4	3.56	5.13	1.44	17	Worm	4
Maudslay	6	3.56	5.13	1.44	30	Worm	4
Napier	4	3.25	5.00	1.54	15	Bev'l or Worm	3
Napier	6	4.00	5.00	1.25	45	Bevel	3
Napier	6	4.00	5.00	1.25	65	Bevel	3
New Arrol-Johnston	4	2.72	4.72	1.74	11.9	Bevel	4
New Arrol-Johnston	6	3.16	4.72	1.50	23.9	Bevel	4
New Engine Motor Co.	4	5.00	4.50	0.90	40	Worm	4
Rolls Royce	6	4.50	4.75	1.05	48.6	Bevel	3
Rover	1	3.81	4.48	1.18	6	Bevel	3
Rover	4	2.97	5.13	1.73	12 Poppet	Worm	3
Rover	2	3.00	5.13	1.71	12 Daiml'r	Worm	3
Rover	4	3.53	5.13	1.45	18	Worm	4
Sheffield Simplex	6	3.53	5.00	1.42	25	Bevel	3
Sheffield Simplex	6	4.50	4.50	1.00	45	Bevel	2
Singer	4	3.16	5.13	1.63	15	Bevel	4
Singer	4	3.56	5.13	1.44	20	Bevel	4
Star	4	2.69	4.72	1.75	10	Bevel	3
Star	4	3.56	4.72	1.33	15	Bevel	4
Star	6	3.16	4.72	1.49	20	Worm	4
S. S. & S.	4	3.44	4.72	1.37	15	Bev'l or Worm	3
Sunbeam	4	3.16	5.91	1.87	12–16	Bevel	4
Sunbeam	6	3.56	6.31	1.77	25–30	Bevel	4
Swift	1	4.13	5.00	1.21	7	Bevel	3
Swift	2	4.03	4.38	1.09	10–12	Bevel	3
Swift	4	3.34	4.72	1.41	15–18	Bevel	4
Thames Ironworks	4	3.16	5.31	1.68	15.9	Bevel	4
Thornycroft	4	4.50	5.00	1.11	30	Bevel	3
Vauxhall	6	3.56	4.72	1.32	30	Bevel	4
Wolseley	4	3.13	4.75	1.52	12–16	Worm	3
Wolseley	6	3.56	5.13	1.44	24–30	Bevel	4
Wolseley	6	4.50	5.75	1.28	50	Bevel	4

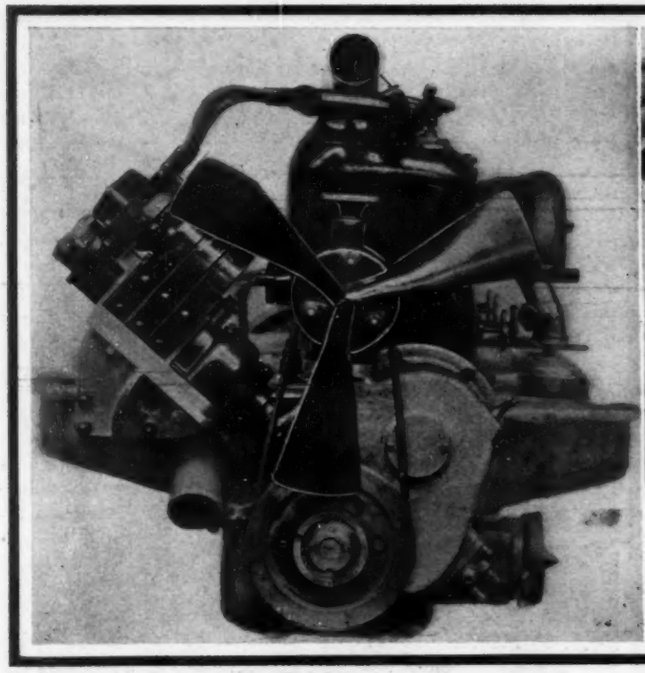


Rear axle of the Lanchester showing the differential cover removed

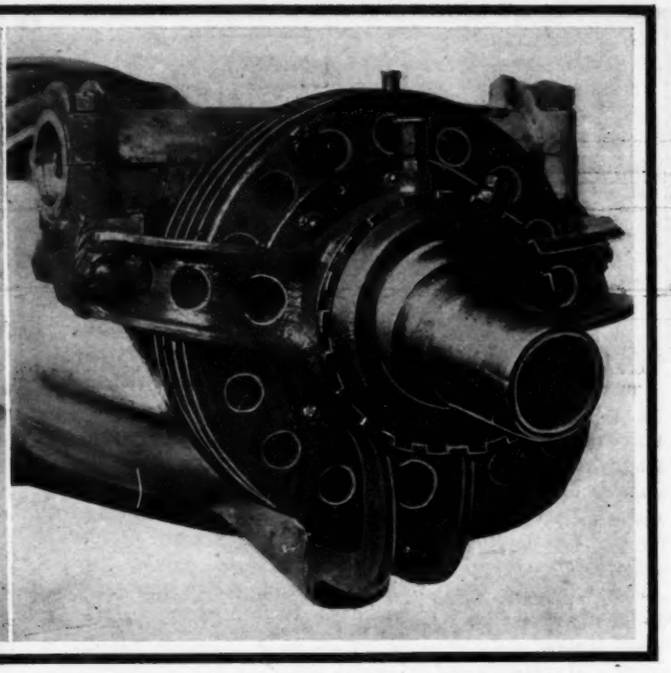
Bear axle of the Panhard—D, differential housing; T, axle casing

Showing general design of Crossley double-drive rear axle

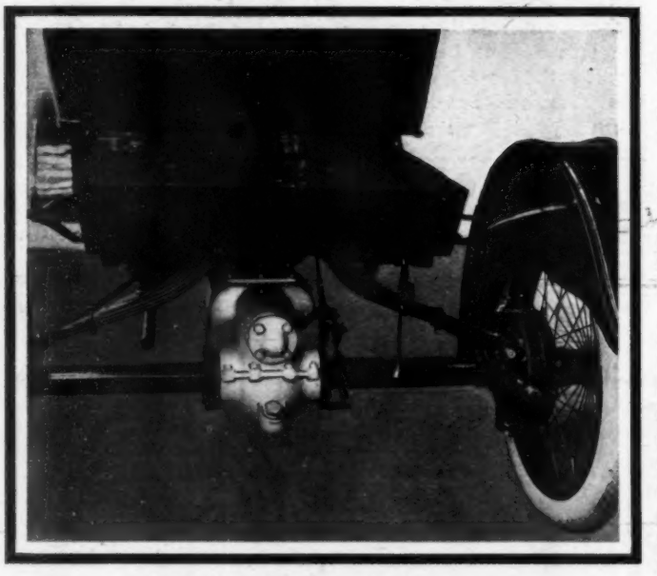
Rear portion of Wolseley 16-20 chassis, showing spring arrangement



Front view of Sheffield-Simplex 1912 model motor



Showing details of the gearset of the 1912 Crossley



Rear axle and spring of B. S. A. car

Average Prices of British Cars

In 1911 there were seven one-cylinder cars manufactured and sold at prices varying from $735 to $1,305, the average price being $1,010. For 1912 there are only six one-cylinder cars listed, and at a price of $650 to $1,175, the average price being $835.

As regards two-cylinder cars, seven models were listed at a price of $850 to $1,365, the average working out at $1,160 while for 1912 the number has increased to nine, ranging in price from $750 to $1,325, or an average of $1,110 each.

With regard to four-cylinder cars, there is a considerable increase in the number of medium-powered four-cylinder cars to be placed on the market selling up to $1,750: for example in 1911 there were nineteen four-cylinder models, varying in price from $1,415 to $1,750, the average price working out at $1,555 each. This number for 1912 has increased to thirty-three models, varying in price from $855 to $1,700, the average price being $1,285.

The cheapest four-cylinder car to be put on the market for 1912 is a 10-horsepower R. A. C. rating, sold complete at $875, while the highest power car is one of 24.8 horsepower, sold complete at $1,725.

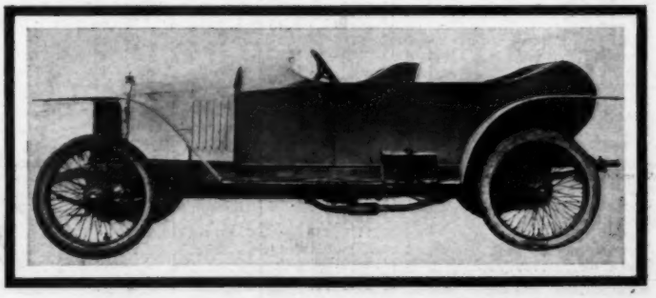
The Belsize company, a firm which has hitherto been one of the leaders in the lower-price cars, has introduced a new model, 11.8 horsepower, which will be sold complete at $1,050.

The Arrol-Johnston company is introducing a car of similar power at $1,425 complete, while the Daimler company is introducing a car of 13.9 horsepower, sold as the B. S. A. for the price of $1,625 complete, or chassis price $1,250. Thus British manufacturers are producing lower-priced cars than has hitherto been the rule.

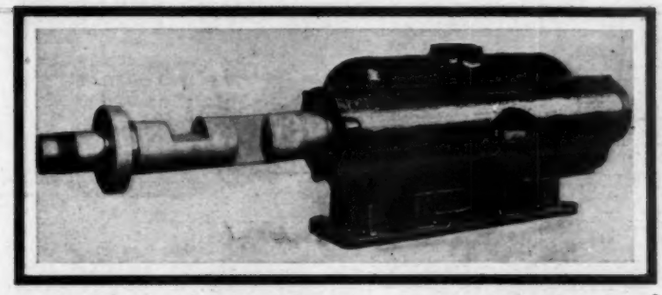
There appears to be no diminution in the number of British manufacturers; on the contrary the number of manufacturers has increased during the present year. Neither is there any diminution in the number of models produced, which shows an increase of about 10 per cent. The six-cylinder car maintains somewhat of a stationary position as regards numbers, and some twenty-eight models will be found listed in this class, the cheapest vehicle being the 29.4 horsepower Vulcan and the 36.2 horsepower Belsize, which are listed at $1,975 for the chassis, while the most expensive are the 59.9-horsepower Napier at $4,975 and the 48.6-horsepower Wolseley at $5,000.

British Trade Statistics

During the year 1910, the value of the imports of cars, chassis and parts totalled $25,673,830, of which re-exports were made to the value of $2,610,860. The exports of British manufactured goods amounted to $13,027,625, the actual number of cars manu-



Vauxhall car with a new design of semi-racing body



Cylinder casting of new Darracq with rotary valve partly withdrawn

factured by the British makers being between 18,000 and 19,000.

The past season has been an extremely good one for the British manufacturer, and all the established firms have been able to keep their factories running at full pressures, and statistics which are made up to the end of September 30, 1911, go to show that the trade of 1911 will be considerably in excess of the trade of 1910, and that the prospects for 1912 are indeed favorable.

It is not quite easy to compute the actual number of cars built in Great Britain, but a fair estimate can be made by taking the increase in the registration, as given by the various county and borough county returns. In 1910 the total number of vehicles, excluding motor cycles, registered in Great Britain, was:

Motor cars	124,860
Commercial vehicles	7,406
Total	132,266

The corresponding figures for 1909 were 107,934, thus showing an increase in the number of cars registered of 24,332 in 1910; as a matter of fact, the actual number will be rather less; owing to the fact that lapsed registrations are not always accounted for.

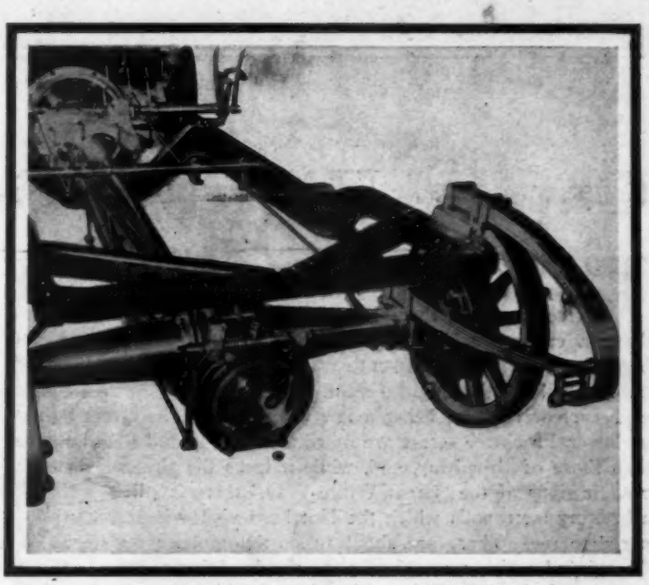
In 1910, 2,995 cars and chassis were exported to British possessions, and 1,124 to foreign countries, of which 77 came from the United States.

The total imports for the 9 months to September 30, 1911, amount to $22,825,965. The re-exports are valued at $2,129,590, and the exports of British goods at $10,600,000, which show a very large percentage of increase over the same period in 1910.

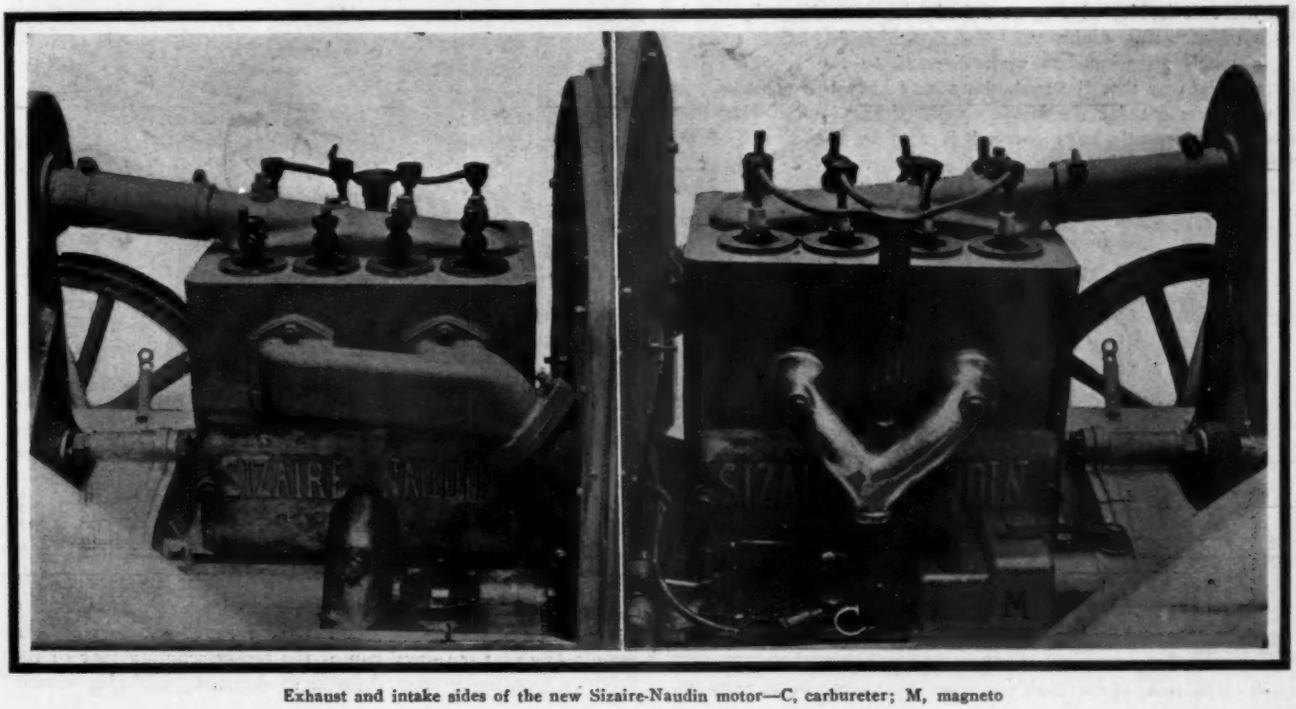
The imports comprised 10,125 vehicles and chassis, as compared with 8,352 in 1910, and there is no doubt that a considerable percentage of the increase represents American cars.

From the figures given above it will be seen that in 1910, 1,101 cars were imported from America, and there is evidence that that number will be more than doubled during the present year, as for the 7 months ending July the number of cars imported from the United States was 1,875, having a total value of $1,635,995, the average price of the cars imported being $885 each, whereas the average price of the total imports is $1,305 and the average for 1910, $1,430.

Although the threatened invasion of American cars has not yet to any great extent affected the English manufacturers, there is evidence that the manufacturers here are preparing to meet competition. It is quite evident that the imports of American cars to this country are of a type which have not been hitherto constructed by British makers, and little or no attempt has yet been made to produce a similar type in this country.



New differential brake used on La Buire cars



Exhaust and intake sides of the new Sizaire-Naudin motor—C, carbureter; M, magneto

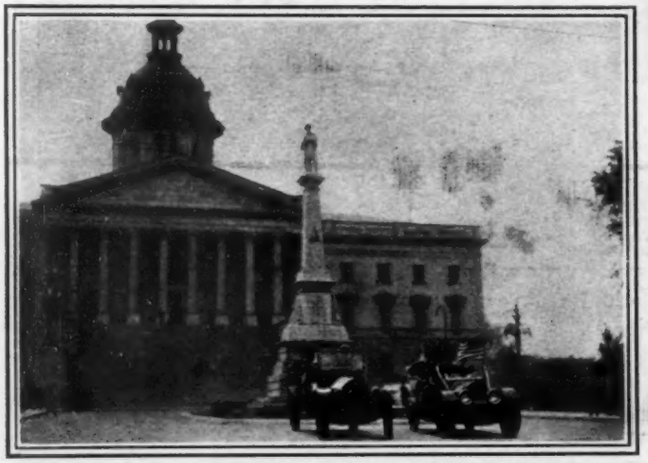
Commissioner Watson piloting the T.C.A. touring party into Columbia, S. C.

Capital Highway South's Trunk Line

THE most flattering thing you can say to Atlantans is that they live in the New York of the South and that Peachtree street is their Broadway. Indeed, it is harder to drive a car through Peachtree street than through Broadway because all the north and south travel is crowded onto this comparatively level thoroughfare and the traffic regulations are *nil*, each cart or carriage being a law unto itself. The street lights of lower Peachtree street are more picturesque and illuminating than those of Broadway, and, while it lacks the skyscrapers and electric signs of the "Great White Way," there is still the air of a bustling metropolis which the Northern visitor is scarcely prepared to see. There are about 12,000 automobiles registered in Georgia of which more than 3,000 are in Atlanta, being one to every tenth family. This, with other considerations, makes Atlanta the logical touring center of the South and consequently the most desirable point to be linked with New York by trunk-lines of motoring highway.

So much attention has been directed to the so-called National Highway that the unthinking may have lost sight of that other movement for the improvement of the Capital Highway, which has recently been covered *in toto* by the scouts of the Touring Club of America. This movement has been fostered by the Capital Highway Association, of which Leonard Tufts is the president, and so much work has been done within the past three years that to-day more than two-thirds of the road between New York and Atlanta is in excellent touring condition and the balance is rapidly being completed. All of this improvement below Richmond consists of building sand-clay roads, which, when properly constructed, are equal to macadam. The peculiar physical location of this route gives particular encouragement to the use of these materials for it approximately skirts the edge of the clay belt and in some cases one can literally dig sand from one side of the road and clay from the other. Then, too, it reaches the capital of every Southern State which it traverses, including the national capital at Washington, to say nothing of the numerous Winter resorts, such as Pinehurst, Camden and Aiken.

Lands in Harnet County, N. C., are barren and roads unimproved

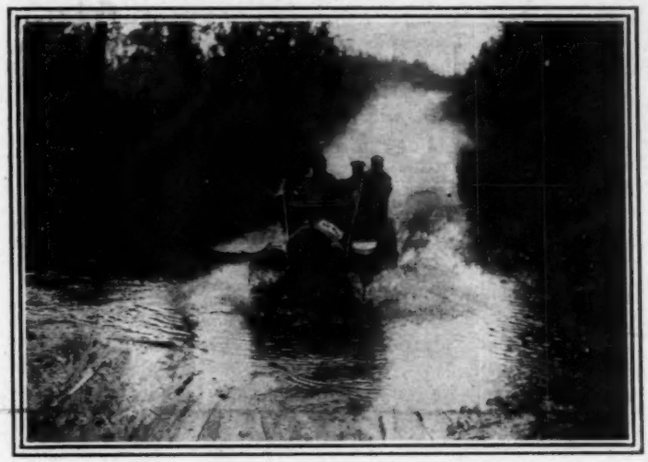


Lined up in front of the battle monument just before leaving Columbia

The only point on the Capital Highway of which the tourist should be warned is Culpeper, Va., where a carpet-bagging J. P. holds court, ably abetted by a horse doctor, both of whom in their more prosperous days hailed from a well-known Northern State. The first ten days' run of the recent scouting tour of the T. C. A. was made from Atlanta to Augusta, following closely

the Georgia Central Railway. The distance is 172 miles and was covered in ten hours' elapsed time through a driving rain. The only bad stretch is 20 miles between Madison and Greensboro, which is mostly slippery red clay. Beyond Greensboro the road is sandy, the last 20 miles being built of the famous cement gravel which is found in abundance in this section.

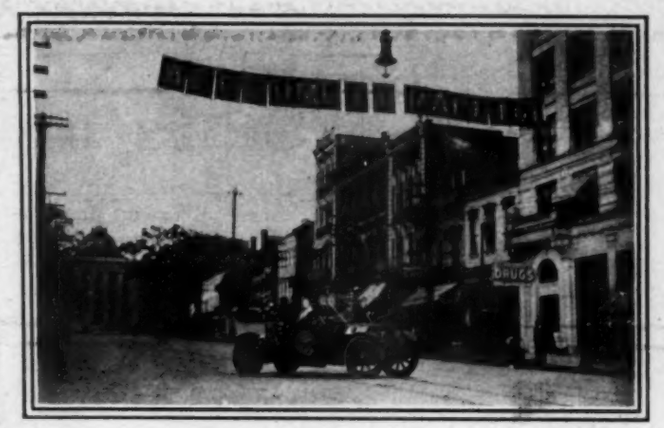
Crossing the Savannah River at Augusta the scouts entered South Carolina and found on the way to Aiken much improved sand-clay road. Aiken is also a famous Winter resort, whose most famous restaurant is conducted by the former chef of William S. Whitney. The road between Aiken and Columbia is mostly of sand-clay, but it has not received the attention it deserves and consequently is full of ridges where the ground is too high and full of holes where the surface is too flat. The first 15-



Innumerable fords were encountered by the pathfinders in the Carolinas

mile stretch out of Columbia was considered at one time the best example of sand-clay road in America, but this has been allowed to deteriorate, though one can still make excellent time over it. About half of the remainder of this road to Camden has been improved and work is still in progress. A new hotel at Cheraw furnishes first-class accommodations, supplemented by a complete garage and machine shop. From Cheraw to the State line one of the worst stretches of the trip is encountered.

Entering North Carolina the roads improve and continue excellent through Rockingham, a cotton manufacturing town with hotel and garage accommodations. A short stretch of narrow sandy road is encountered after one turns off the main road into the pine woods, but the last 15 miles, entering Pine-



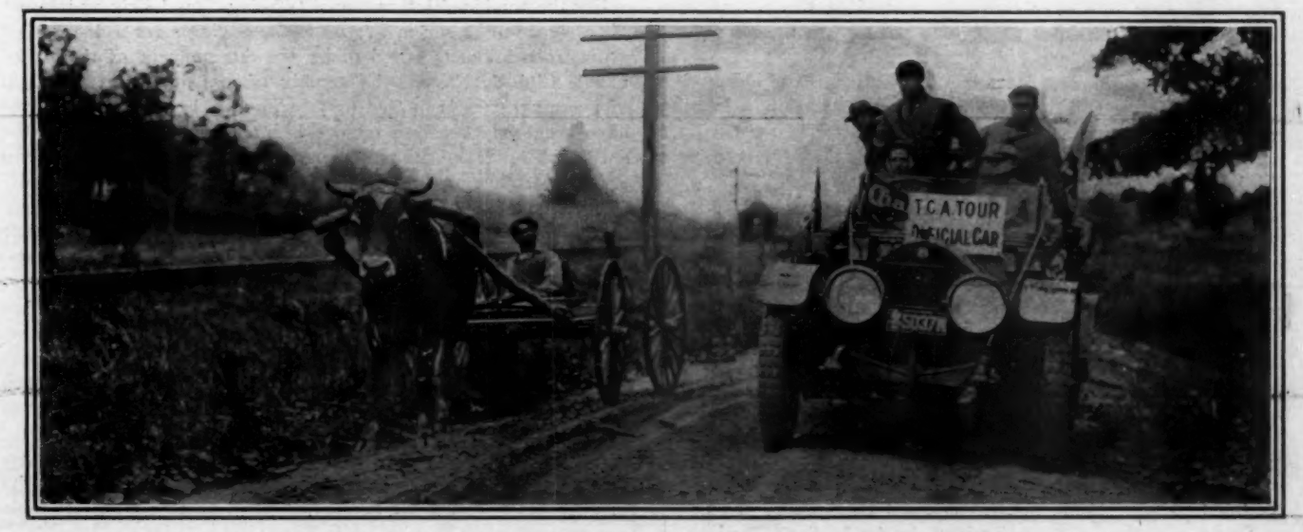
The scouts arriving in Raleigh, N. C., on the fourth day

hurst, is the best trip thus far, due particularly to the fact that is has been dragged.

The direct road from Pinehurst to Raleigh is 81.7 miles, but, owing to the fact that little interest is manifested along this route the scouts were advised to go via Fayetteville. After passing through Harnet County one encounters some very poor narrow, sandy roads, but upon entering Wake County the road gradually improves and is fine as one nears Raleigh, the capital of the State, and famed as the birthplace of Andrew Johnson. After crossing the Neuse River a splendid new road is followed which though winding, is of excellent construction, and the 45 miles to Henderson is handily covered in 2 hours. From Henderson to Roanoke Rapids, a cotton milling town, the road is fair-to-good, but after crossing the Roanoke River, where a toll of 50 cents is exacted, a stretch of very heavy sand is encountered for about 10 miles. This is amply compensated, however, by the magnificent stretch of sand clay road from Barley to Emporia, a distance of 15 miles.

After leaving Emporia the old Coast Line right-of-way is followed for a short distance. Then comes a stretch of well-graded road which needs a proper dressing of sand-clay. Fifteen miles out begins the most wretched part of the whole Capital Highway, which extends 7 miles to Stony Creek. From Stony Creek the Coast Line right-of-way is followed into Petersburg.

The scouting tour was terminated at the Hotel Jefferson, Richmond, the car having covered 715 miles in less than 5 days, but would be more comfortably taken as a tour in 6 days. With the improvements now in progress and with careful driving the trip can be made in comfort in that time.



The railroad, the ox-cart and the automobile—three types of transportation exemplified

Pope Stars in Phoenix Races

PHOENIX, ARIZ., Nov. 9—Two serious but not fatal accidents marred an afternoon of sensational racing at the Arizona fair grounds to-day. Harris Hanshue, of Los Angeles, and Fred Fuller, of En Centro, both driving Mercers, crashed through the fence but miraculously escaped with their lives.

Traveling faster than a mile a minute, Hanshue punctured the inner railing on the fourth turn of the mile track. When picked up by the attendants in a Red Cross truck, which was on the grounds, Hanshue was unconscious. An examination proved that he had received only a severe wound in the head, a strained hip and various bruises. There were no internal injuries. Fuller was only shocked. His car was a total wreck, but Hanshue's machine left the grounds under its own power.

Hanshue's accident occurred during the 10-mile handicap race for all the cars that participated in the Los Angeles-Phoenix road race. For several miles the Franklin and National were struggling for first place, then the Mercer moved up until it was just behind the National, which Ed Swanson, mechanician to Harvey Herrick, who won the Phoenix race, was driving. Hanshue took several long chances in attempts to swing in and grab the pole. While he was taking one of these chances the steering knuckle broke and the Mercer rammed a hole in the fence. Before he was thrown out Hanshue had time to jam on the emergency brake. He went in one direction and the car in another.

This race was won by the National, with the Franklin, driven by Guy Irwin, second. The other starters were: W. D. Tremaine, in the Pope-Hartford, Bill LaCasse, in the E-M-F, George Soules in the Flanders, W. F. Brong, in the Case, and Charles Bigelow, in the Cadillac. The National was the basis of handicapping. The Flanders was given 50 seconds start; E-M-F and Case, 30; Cadillac, 20; Pope and Franklin, 15; Mercer, 10.

Fuller's accident occurred during the 25-mile, free-for-all for cars with a piston displacement of more than 231 inches. Bert Dingley started in the racing Pope, Hanshue in his Mercer, Swanson in the Phoenix road race National, Fuller in the Phoenix racer Mercer, Frank Seifert in the National that won the Santa Monica race and Louis Nikrent in a Buick.

Fuller never figured as a possible winner, but drove a daring race. He took one chance too many and at the second turn crashed through the outer fence. He went up in the air several feet but came down in the disintegrating car.

The Pope got the best start but the National was close, with Hanshue's Mercer and the other cars strung out behind. Dingley ran the first 5 miles in 4:46.05; 10 miles, 9:30.36; 15, 14:19.17; 25, 23:52.96. The National was second with the Mercer a close third.

By far the most sensational race of the day was the 10-mile free-for-all. Mile after mile Dingley, in the Pope, and Seifert, in the National, struggled for first place. No prettier race ever was seen on any track. Dingley won easily, once he secured the pole. He did so only after many sensational trials and hair-raising escapes from collisions. Seifert got away first and hung to the pole. It was during the eighth mile that Dingley took the lead. This mile was covered in 52 4-5 seconds, and is said to have been the fastest mile ever made in competition.

Five cars started to beat the Phoenix track record of 56 seconds, held by the Apperson. Both the Pope and National succeeded. The Pope's time was 52 3-4 seconds and that of the National 52 4-5. Louis Nikrent covered the mile in 57.35 with his California Buick; Tom Carrigan, in the Midland, made it in 1:05.56 and William Ferguson, who drove the Arizona Buick, in 1:05.56.

With one exception the time of the Pope is the fastest ever made on the Pacific Coast over a mile circular track. The record is 51 4-5 seconds and was made by Barney Oldfield, with a 200-horsepower Blitzen Benz.

Four machines started in the 15-mile event for cars participating in the Phoenix race, having a piston displacement of 301 inches or over. There was a pretty struggle for first place between the National and Nikrent's Buick, but the National won. Its time for 5 miles was 4:57.55; 10 miles, 9:43.22; 15, 14:37.67. The Buick was second, with the Franklin third and the Midland fourth.

Hanshue was the hero of the 10-mile race for cars in the Phoenix race, having a displacement under 301 inches. At the start the Cadillac, driven by W. W. Bramlette, and the E-M-F, took the lead. The Mercer, Case and Cole, with John Jenkins at the wheel, were strung out behind. Soon it became evident that the Mercer was more of a factor than had at first appeared. Hanshue kept on the outer edge of the track and crept up, passing first the E-M-F and then the Cadillac. That happened during the fifth mile. Thereafter no interest attached to the race except for Hanshue's fast driving. Finally the E-M-F slowed up and was passed by the Case. They finished with the Mercer first, Cadillac second, Case third, E-M-F fourth and Cole fifth. The Cole was distanced, owing to a cracked cylinder. Hanshue's time for the 10 miles was 10:34.05.

There was a special event for the cars in the Phoenix race that arrived first, second, third and fourth, but W. D. Tremaine's Pope, which came in fourth, did not start. The National took the lead and easily held it to the end, winning in 10:15.56. There was a fight between the Cadillac and the Franklin for second place, but the Cadillac won out, taking the lead in time to beat its rival.

An attempt was made by George Soules, in a Flanders, to lower the world's 5-mile circular track record for 20-horsepower cars. The record is 5:42 but the best that Soules could do was 5:57.51.

Entries for the French 1912 Grand Prix

For the combined international two-day *Grand Prix* and *Coupé d'Auto* race to be run in France in the Spring, over a distance of about 2,000 kilometers and under the management of the Automobile Club de France, the number of entries by any one firm of manufacturers is limited to 4. Unless at least 30 entries shall have been duly received on ore before December 30, 1911, the event will be called off and the entry fees refunded. American as well as other nominations must be in the hands of the Sport Committee of the Automobile Club de France before the date mentioned accompanied by the regular fees, which are $300 for one car, $500 for 2, $750 for 3 and 900 for 4. Thereafter, if the requisite number of entries for securing the event has been received and accepted, additional entries will be accepted at doubled fees up to March 31, 1912.

Cars of any preferred design, size and power may take part in the Grand Prix section of the event, excepting that the track width, from hub to hub, center to center presumably, must not exceed 1.75 meters.

If more cars are entered than can safely be run, in the opinion of the management, the Sport Committee reserves for itself the privilege of reducing the number by drawing lots or any suitable means.

Hudson and Cadillac Win Harrisburg

HARRISBURG, PA., Nov. 14—A Hudson, entered by I. W. Dill and driven by Roy Hamilton, won first prize in the dealers' class, and a Cadillac car, owned by W. P. Starkey, and driven by himself, won the first prize in the private owners' class of the Harrisburg economy run given yesterday by the Motor Club of Harrisburg, from Harrisburg to York. The cars before leaving on the 104-mile trip yesterday morning were sealed and upon their return last evening were opened by the technical committee and the amount of the gasoline consumed on the run was then recorded. The Hudson car consumed 5 gallons and 1-8 pint and the Cadillac car 6 gallons and 1 quart on the entire trip.

The cars left Market Square at Harrisburg and the pacemaker, a Pullman, in charge of E. G. Brandt and Referee Douglas, was the first machine away at 9:38. The others cars got away at 1 minute intervals and took up the course to York at a 16-mile an hour speed. The route of the run lay through Dauphin, Cumberland, York, Adams and Lancaster counties. After crossing the Susquehanna river and passing Camp Hill the machines went to Dillsburg, East Berlin, Abbottstown, Hanover, Menges Mills to York, where a stop of 90 minutes was made for lunch. At 2:18 the machines began to depart via Columbia, Florin, Marietta, Middletown and Steelton. The roads were in fairly good condition, the only hindrance being the cold. The cars checked in at Market Square at 4:45 o'clock. Seventeen cars carrying 70 persons were entered in the run and all finished the run with the exception of 2 cars that were withdrawn. Three cars met with accidents, which included the two Kline Kars entered by the Kline Motor Corporation. Up until the accidents, the cars had made an excellent showing.

The following shows the total fuel consumption:

No.	Car.	Entrant.	Gal.	Qts.	Pts.
5	Hudson	I. W. Dill	5	0	⅛
14	Cadillac	C. C. Crispen	5	1	1¾
4	Hudson	Murray Dick	5	2	1
6	Inter-State	I. W. Dill	5	2	1⅝
13	Cadillac	H. D. Delmott	5	3	½
17	Cadillac	C. C. Crispen	6	0	1¾
15	Cadillac	W. P. Starkey	6	1	0
3	Chalmers	R. L. Morton	6	1	½
9	Flanders	E. L. Craft	6	3	1½
16	Cadillac	C. E. Covert	7	2	½
19	Everitt	G. C. Furl	7	2	1
7	Chalmers	Jno. Gallagher	7	2	1½
8	E-M-F.	E. L. Craft	7	3	1⅛
2	Hudson	J. H. Benfer	8	3	0
11	KlineKar	J. A. Kline	8	3	1½
12	KlineKar	J. A. Kline	Withdrawn		
18	Reo	G. G. McFarland	Withdrawn		

The awards were based upon the following cost per mile per passenger:

Class A, Touring Cars, $1,000 and Under

9—Flanders	.00212		

Class B, Touring Cars, $1,000 to $1,500

19—Everitt	.00233	8—E-M-F.	.00242

Class C, Touring Cars, Above $1,501

5—Hudson	.00154	3—Chalmers	.00195
14—Cadillac	.00167	13—Cadillac (4 pas.)	.00222
6—Inter-State	.00175	7—Chalmers	.00235
17—Cadillac	.00188	2—Hudson	.00268
15—Cadillac	.00191		

Class CC, Runabouts, Above $1,501

4—Hudson	.00430	11—KlineKar	.00683
16—Cadillac	.00531		

National Wins at San Antonio

SAN ANTONIO, TEX., Nov. 13—A three-day track meet run by the San Antonio Club, was completed this afternoon, the feature of which was a 4 1-2-hour race split into three sections of 1 1-2 hours a day this was won by a National, driven by Sutherland, the car covering 225 miles in the 4 1-2 hours. Second was a Jackson, driven by Meleun, with 216 miles; third was an E-M-F, driven by Reeves, 213 miles; fourth was a Staver-Chicago, driven by Knudson, 203; and fifth was a Flanders, driven by Potter, 195 miles. Ten originally were scheduled to start, but the Cutting went out early because of a loose radiator, while the Flanders caught fire at the pits and was withdrawn.

Originally the meet was scheduled to start last Thursday, but the weather conditions were such that the 3-4-mile track was deemed unsafe so the actual racing was postponed to Saturday, continued yesterday and finished to-day. Before the start of the long grind each day there were short-distance races in which the Cino did especially well. The summaries of the three days of racing follow:

FIRST DAY

Class C, Division 3C, Non-Stock, 12 Miles

Pos.	Car.	Driver.	Time.
1	Cino	Raimey	13:49
2	Staver-Chicago	Monckmeier	
3	E-M-F.	Reeves	

Special Match Race, Five Laps

1	Cutting	Clark	4:22⅘
2	Jackson	Fred Meleun	

Class D, Non-stock, Free-For-All, 21 Miles

1	Cino	Raimey	24:29
2	Staver-Chicago	Monckmeier	

4½-hour Race, First Section (62 Min.)

National, 72 laps; Ohio, 72 laps; Jackson, 71 laps; Staver-Chicago, 69 laps; Cino, 68 laps; Staver-Chicago, 66 laps; E-M-F, 63 laps; Pope-Hartford, 56 laps.

SECOND DAY

Class C, Division 3C, 9 Miles

1	Cino	Raimey	9:53⅘
2	Staver-Chicago	Knudson	
3	Staver-Chicago	Monckmeier	

Free-for-All, 15 Miles

1	National	Sutherland	16:41⅘
2	Staver-Chicago	Monckmeier	
3	Jackson	Meleun	

4½-hour Race, Second Section (118 Min.)

Total distance—National, 202 laps; Jackson, 195 laps; E-M-F, 187 laps; Staver-Chicago, 177 laps; Flanders, 171 laps. Leader's mileage, 152½.

THIRD DAY

First Event, 16 Laps, 12 Miles, Class C, Division 4-C

Pos.	Car.	Driver.	Time.
1	Cutting	Clark	12:56.20
2	National	Sutherland	
3	Jackson	Meleun	

Second Event, 24 Laps, 18 Miles, Class E

1	Cino	Raimey	21:05
2	E-M-F.	Reeves	
3	Staver-Chicago	Knudson	

4½-Hour Race, Third Section (90 Min.)

1	National	Sutherland	225 miles
2	Jackson	Meleun	216 miles
3	E-M-F.	Reeves	213 miles

Flanders Cars Break Class Records

INDIANAPOLIS, IND., Nov. 14—New records were established at the Indianapolis Motor Speedway yesterday. Frank Witt drove a Flanders Class B stock car in Division 1B, 160 cubic inches and under 1 mile in 56.80; 5 miles in 4:22.98; 10 miles in 9:27.49; 15 miles in 14:13.26; 20 miles in 19:00.87. Robert Evans drove a Flanders Class C, 160 inches and under, 1 mile in 56.80; 5 miles in 4:26.10; 10 miles in 8:53.95; 15 miles in 13:24; 20 miles in 17:54.80.

F. E. Edwards, A. A. A. technical committee, examined the cars, and the timing was done by the Warner electrical device. It was intended to go after 25 and 50-mile records, but the cold was too great for the drivers.

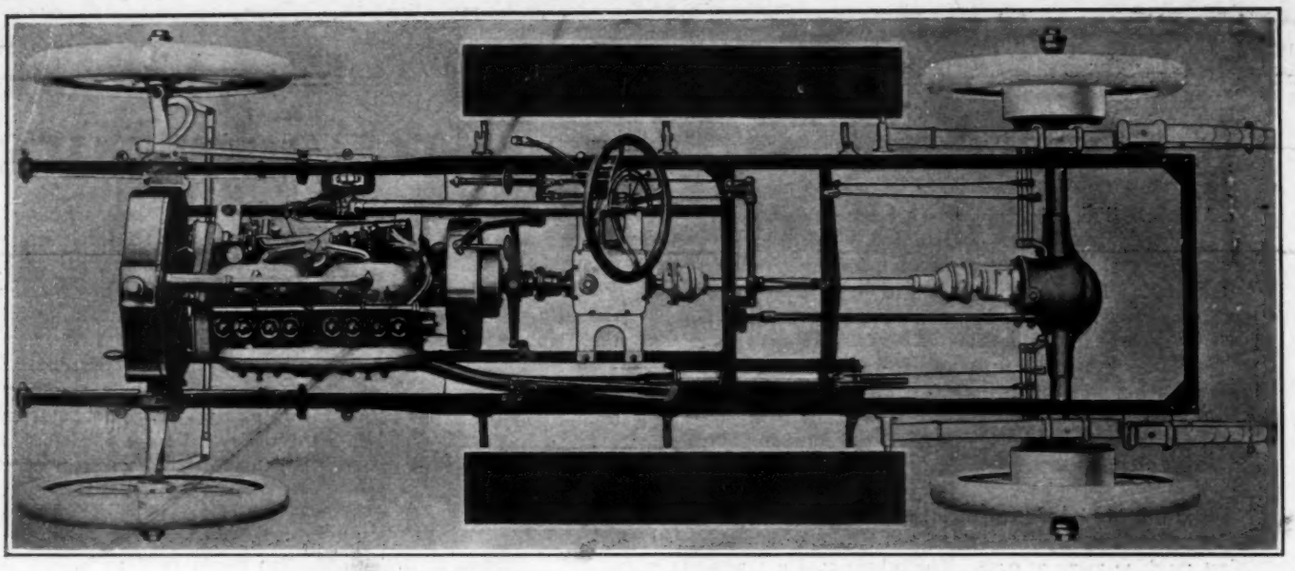


Fig. 1—The standard chassis used in connection with all models of the Selden line

Selden Refinements for 1912

A SINGLE chassis features the Selden line of cars for the season of 1912. The various styles of body are fitted upon this chassis and the only change necessary in the constructive details when fitted with bodies of different types is in the steering columns and control levers.

The motor is rated at 40 horsepower and has a bore of 4 3-4 inches and stroke of 5 inches. There are four cylinders, which are cast in pairs with the valves all on the left side of the motor. All the valves are made interchangeable, having a diameter of 2 1-4 inches and a lift of 5-16 inch. A feature of the cylinder casting is that it is arranged with a web which forms the basis of a cover which serves to completely house the valve mechanism. The covers are easily removable by turning the hand screws, which may be seen at C, Fig. 3. The manifolds are held to the cylinders by means of the dogs and studs which are shown at D. A detail of interest is the manner in which the indicator P is attached to the engine frame so that the marks on the flywheel corresponding to the phases of the cycle may be easily read.

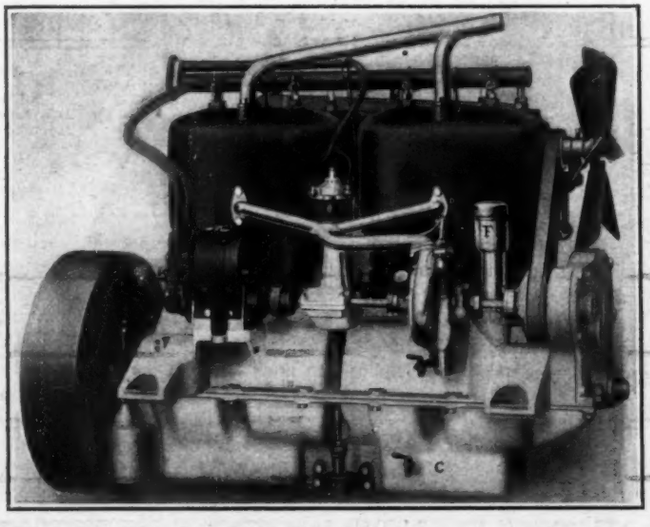


Fig. 2—Right side of the Selden 40-horsepower motor, showing the magneto and pumps

The motor is water-cooled, the cylinders being cast integrally with their water jackets, which have removable covers so that they may be readily cleaned when necessary. The water is circulated by means of a centrifugal pump located on the right side of the motor and driven by a horizontal shaft which is actuated by a set of gears contained in a housing at the front end of the motor. The water pump is of large capacity so that a sufficient supply of water will be assured at all speeds. There are baffle plates located within the water jackets so that the water will be directed to the most needed points and a reliable circulation maintained. The water is led to and from the radiator by means of seamless brass tubing, the end connections being made by using specially treated rubber. The square-tube radiator is kept cool by means of a six-bladed fan which is driven by a belt from the same shaft as that which drives the water circulating pump. The fan is mounted on ball bearings and is fitted with an automatic spring tension for the belt. There is a removable coupling in the shaft so arranged that it is very easy to take out and replace the belt without disassembling any other parts of the motor. The crankshaft is a drop forging of nickel steel specially heat-treated. It is carried upon three large plain bearings which are lined with die cast soft metal.

The camshaft is of the built-up type; that is, the cams are machined and hardened separately and then pinned to the shaft in their proper positions. In case of an injury to one of the cams it may readily be removed and replaced without tearing down a large part of the assembly.

The valve push rods are of the mushroom type, acting directly between the cams and the valves. To render desired adjustments easily possible, screws are fitted by means of which any wear may be taken up. The push rods act in guides, which tend to reduce chattering and rapid wear in the valves and the other parts of the valve action. The push rods and their guides are so constructed that they may be readily removed without interfering with any other part of the valve or engine mechanism.

The carbureter is carried on the left side of the motor; it is of the Stromberg double-jet type and is fitted with a hot-water jacket. The gasoline feed is by gravity and is governed by float and needle valve in the carbureter. The gasoline tank is located beneath the driver's seat and has a capacity of 17 gallons.

There has been no change made in the ignition system of the

new car, the Bosch magneto, type DR-4, being used in connection with one set of spark plugs, while an independent battery system is connected to another set of plugs. The spark coil is of the master vibrator type in which there is but one vibrator, so that a uniform spark will be supplied to all the cylinders. As there is a cut-out button on each of the coils it is possible for the operator to at once determine the location of a misfire. All the coil units are easily removable from the casing, which is hinged for this special purpose. Current for the coil is supplied by six dry battery cells located on the running board.

The motor is lubricated by means of a splash system in which the oil is maintained at constant level. The oil is carried in the lower part of the base casting, which is so arranged as to carry both the reservoir for the oil and the troughs by means of which the splash system of lubrication is operated. The lower part of the casting in which the oil is carried has a capacity of 6 quarts and is separated from the upper part of this casting by means of a horizontal tray which carries the splash troughs. There is one of these troughs below each crank throw. The oil is lifted from the reservoir by means of a gear pump which takes the lubricant from the base and puts it into the troughs. The pump is driven by means of a vertical shaft which is actuated by the horizontal shaft driven by the gears at the forward end of the motor. The timer is located at the upper extremity of this shaft, while the oil pump is at the lower.

Besides pumping the oil from the reservoir to the troughs the oil pump also sends it through a lead to the timing gear case, thus insuring ample lubrication at all times. After having lubricated the gears, the oil will drain back to the crankcase. The oil in the troughs is picked up by the ends of the connecting rods and thrown up into the cylinders, which are thus lubricated. The beating action of the connecting rods into the pools of oil formed in each of the troughs churns the oil into a fine spray or mist which pervades the entire crankcase, thus lubricating all the moving parts therein contained. The pump is continually supplying the oil to the troughs at a much more rapid rate than it is being consumed; hence there will be a continuous flow through the overflow ports back into the reservoir. To prevent any accumulated foreign matter from passing through the motor after the oil has once carried it down to the reservoir, there is a screen provided through which all the oil must pass. This screen is inserted in the path of the oil to the pump.

The reservoir is filled through the filler hole F, Fig. 2, which is located on the right side of the motor near the front. It is covered with a screw cap and is fitted with a screen through which the oil must pass. The amount of oil within the crankcase may at all times be determined by means of the ball gauge which is located at the front end of the motor on the right side. The ball riser is of steel and its position may be ascertained by the hand in case the car is in darkness at the time the oil level is to be determined. If there is so much oil within the crankcase that it causes the motor to smoke, the drain cock C in the bottom of the crankcase may be opened and the excess oil allowed to run out.

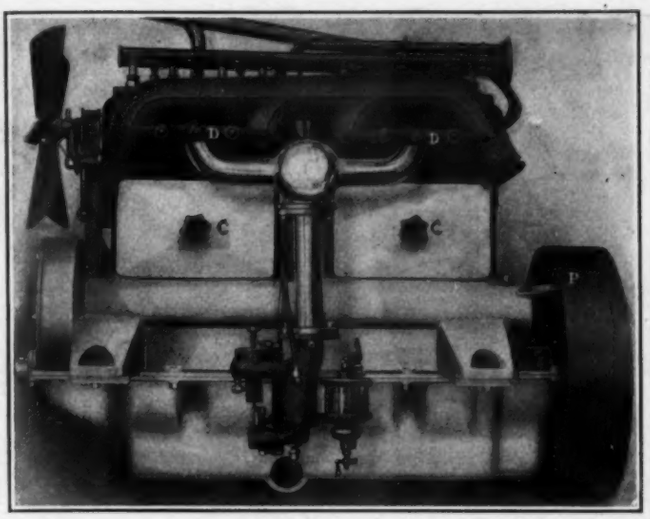


Fig. 3—Left side of the Selden motor, showing the location of the carbureter and manifolds

The clutch is of the multiple disc type, and is enclosed in a housing which is bolted to the flywheel. There are thirteen discs, the driving members being faced with an asbestos composition which is riveted in place while the driven discs are left unfaced. The inner or driven housing holds a pair of heavy spiral springs which supply the necessary pressure. The tension on the springs may be regulated by means of a pressure plate and three studs which extend through the plate. By means of these studs the required adjustments may be made without the removal of any housing or other parts. An automatic spring lock secures the studs and prevents them from turning.

A universal joint of the gear type, consisting of a pinion on the transmission shaft inserted in an annular gear of equal size, connects the clutch with the transmission and allows sufficient lateral play to permit of the clutch being readily thrown out of engagement without any rattle or lost motion. The transmission bearings are so arranged that any thrust due to throwing out the clutch is taken up by them, relieving the motor entirely of this duty. To prevent the clutch from spinning when changing

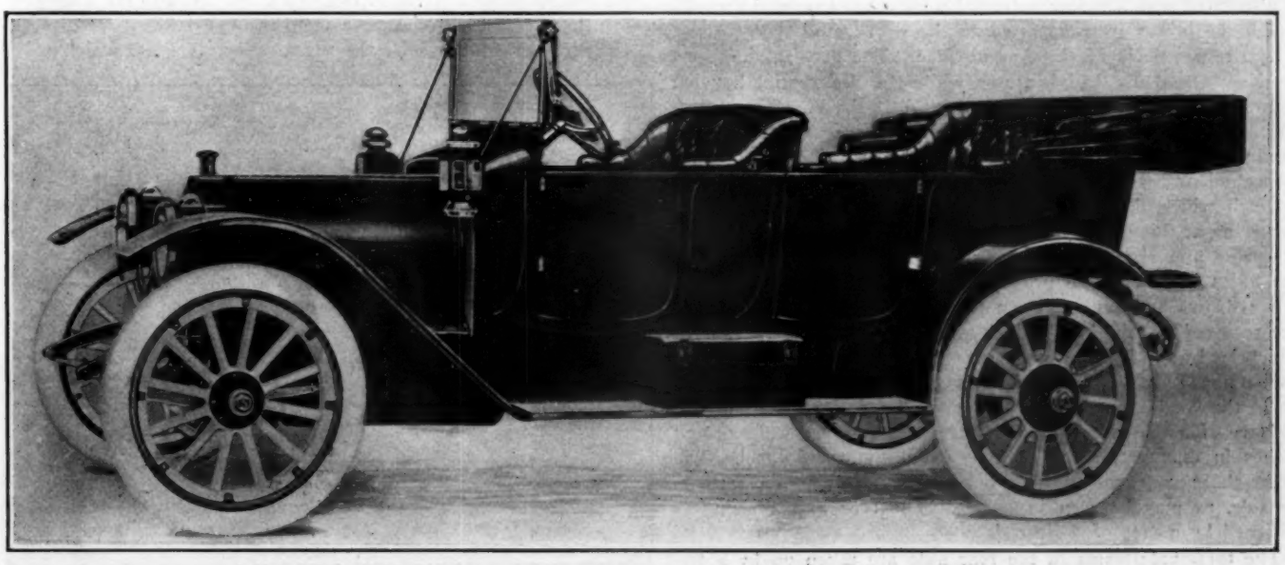


Fig. 4—The Selden model 47 is a fore-door, five-passenger touring car of roomy dimensions

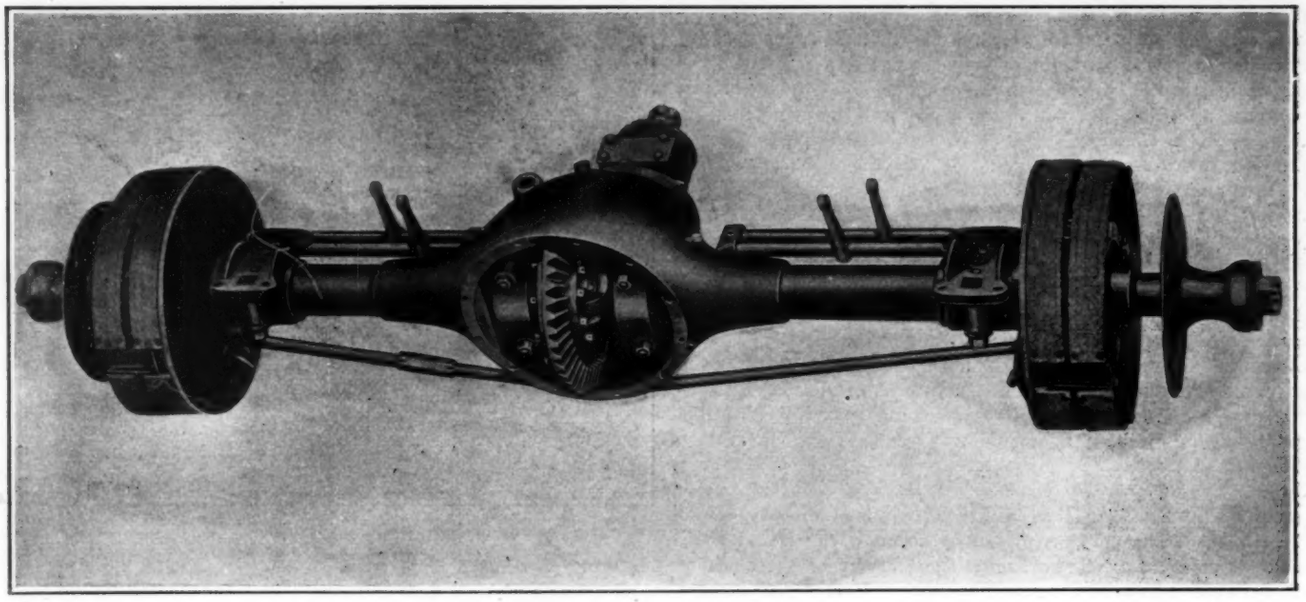


Fig. 5—Illustrating the rear axle of the Selden cars with the differential cover removed

gears, a brake is fitted, thus aiding in this important operation.

Connected to the clutch pedal by a system of levers is the ball thrust. The levers and thrust are so arranged that a light pressure on the pedal will be sufficient to manipulate it. The emergency brake is interlocked with the clutch so that when the brake is applied the clutch will be disengaged, although if it is so desired, this interlocking device may be readily removed. The clutch may be easily disassembled by the removal of a few bolts so that repairs may be simply and readily made when necessary or inspection facilitated.

The gearset is of the sliding selective type with three speeds forward and one reverse, high speed being on direct drive. The shafts run on Timken roller bearings which are adjustable for wear from the exterior of the case, and hence when any adjustments are necessary it will not be required to dismount any of the mechanism. The gearset housing is an aluminum casting which is carried by the subframe by means of four supporting arms which rest upon the top of the frame. Inspection is made readily possible by means of a cover which may be removed without disturbing any other parts.

The power is transmitted from the gearset to the drive shaft through a universal joint of the Spicer type. The drive shaft is also fitted with a Spicer universal joint at the rear end through which the power is transmitted to the differential.

The rear axle is of the floating type. The drive pinion runs on New Departure ball bearings while the differential housing is mounted upon Hyatt bearings with ball thrust. The differential is provided with a cover which is very easily removable so that the entire mechanism may be exposed for purposes of inspection or repair. The axle shafts are provided with flanges through which the hub bolts pass, the chances for lost motion occurring at this point thus being reduced to a minimum, and at the same time the hub caps are relieved of the duty of holding the axles in place. To prevent the oil from leaking into the brake drums and causing them to slip at some time when they are required to take hold quickly, sleeves are fitted on the hubs which lead any oil that may work out along the axle shaft, into an annular recess in the brake flange, whence it is drained out on to the road. The brakes are of the internal expanding type and are of ample size, the bands being 1 3-4 inches wide and 14 inches in diameter, acting directly upon the rear wheel. The brake shoes are fitted with non-burning material and are set side by side, as may be seen in Fig. 5. The rear axle housing is stiffened by means of a tie rod.

The torsional strains in the rear axle are taken up by a triangular torsion arm of heavy gauge tube steel with drop-forged ends. The stress is transmitted to the central cross member of the frame, which is fitted with a bracket supporting the housing that encloses the front end of the torsion arm and the heavy cushion springs. This housing is made tight in order to exclude all mud and water and may be packed in grease to prevent rattling or other noises at this point. The torsion arms are attached to the axle by means of two short vertical pins.

The front axle is a one-piece drop forging of I-beam section while the frame of the chassis is of channel steel 4 3-4 inches deep and 3-16 inch thick, with three cross members and a subframe which supports the motor and gearset. The frame is raised over the rear axle and so shaped as to allow the use of 3-4 elliptic springs. The rear springs are 51 x 2 1-4 inches. The frame is brought in at the front end in order to provide for an easy turning radius. Semi-elliptic springs are used in front. They are 38 x 2 inches.

The wheels on all the bodies are similar, being of wood 36 x 4 inches all around and are fitted with Firestone Q. D. rims. The bearings upon which the wheels are carried are of the ball type, the rear wheels being provided with New Departure bearings containing two sets of balls, while the front wheels are fitted with adjustable bearings of the cup and cone type. The wheelbase for all models is 125 inches, while the tread is the standard 56 inches. The road clearance is 10 inches.

The steering gear is of the worm-and-gear type, which may

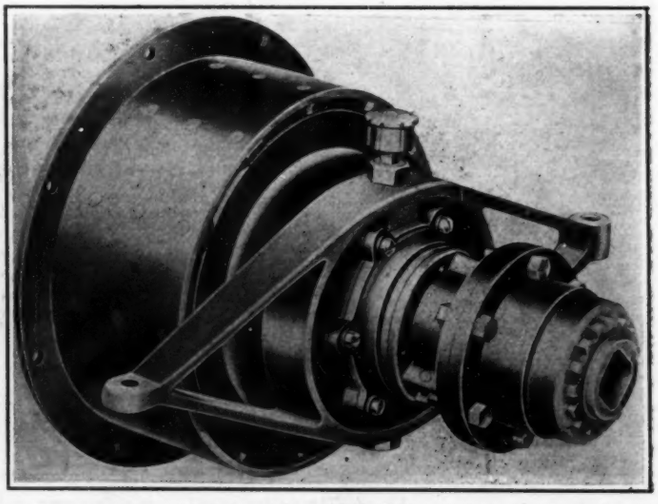


Fig. 6—Showing the dry disc type of clutch employed with all models

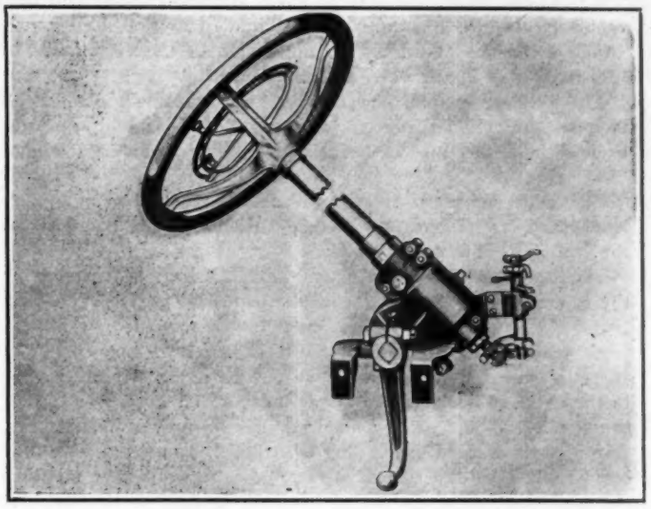


Fig. 7—Condensed view of the steering gear and housing

be so adjusted that four different bearing surfaces are brought into contact with the worm. This method of arrangement will tend to increase the life of the steering parts, as an adjustment may be made from time to time to insure a different part taking up the wear. The steering gear housing is bolted to both the main frame and the subframe in order to secure a stiff and rigid connection. The steering column housing is carried down to the gear casing and connected thereto.

The steering wheel is 18 inches in diameter. The frame of the wheels is of cast aluminum and this is built into a wooden rim of large oval section so that easy grip is secured upon the wheel. The spark and throttle control levers are placed in the center of the wheel on their respective quadrants and held thereto by means of spring catches.

The muffler on the new model car is of the same size as that used in previous years on the Selden cars, but in order to secure a freer exhaust the cut-out valve has been enlarged. A change has also been made in the manner in which the exhaust pipe is supported. The fastening has been so strengthened as to increase the security of the connection, thereby holding the pipe firmly against the vibrations of the car. The mechanism which controls the action of the cut-out has also been completely redesigned.

The foot accelerator, which is fitted to all models, is of the push-button type; it is within easy and comfortable reach of the foot so that the driver may readily operate the car entirely by the manipulations of his foot upon the accelerator pedal.

The head lamp bracket sockets are riveted upon the frame of the car; they are heavy drop forgings and are connected by a tie bar to maintain rigidity. The side lamp brackets are connected to the dash board and carry the front ends of the windshield stay rods.

Another feature which has been changed in the new cars is the length of the running boards, which has been increased to conform to the dimensions of the larger cars. They are now carried upon three step hangers instead of two, so that a stronger connection is maintained. The running board carries the gas tank for the lighting supply and the opposite running board carries the battery box.

A full supply of lamps goes with each model. The head lamps are operated by gas and are suplied by the tank upon the running board; the side and tail lights are a combination of electric and oil. The current for the lights is supplied by an 80 ampere-hour storage battery which is contained in the battery box upon the running board.

The standard equipment furnished with all the cars also includes a top, complete with all curtains and envelope, windshield, battery box, tool box, horn, robe rail, foot rail, muffler cut-out, tire irons and a complete set of tools.

The types of bodies furnished with the new chassis are of five different varieties. The model 47 is a five-passenger touring car of the fore-door type. Model 47-S is larger, being classed as a seven-passenger touring car, likwise of the fore-door type. Model 47-T, known as a four-passenger torpedo, is built along racy lines and is adapted for four people, being of long narrow construction. The 47-R model is a two-passenger roadster with a rumble seat, making the carrying capacity three; this car is also constructed with the idea of presenting a racy appearance and is designed to meet the requirements of those who do not need a larger car. The limousine, which is known as model 47-L, is of large dimensions, being constructed for a seven-passenger capacity; the aluminum body is of special design and will accommodate five passengers in the rear compartment while the front seat will accommodate two. The limousine body, as well as the chassis and running gear, will be painted in standard blue or Brewster green and will be trimmed in broadcloth or cord to match.

The equipment of the limousine will include a divided glass front, removable cab sides, side curtains, two extra swing seats, foot and robe rails, dome lights, toilet case and umbrella holder.

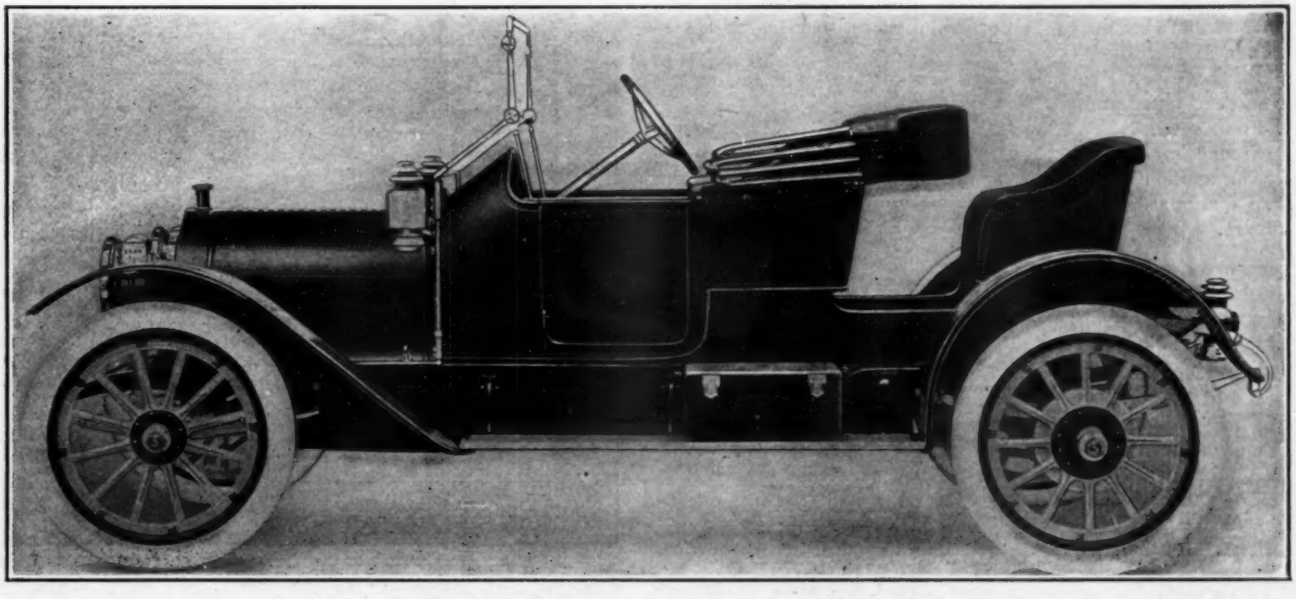


Fig. 8—The 47-R model, a fore-door two-passenger runabout with a rumble seat

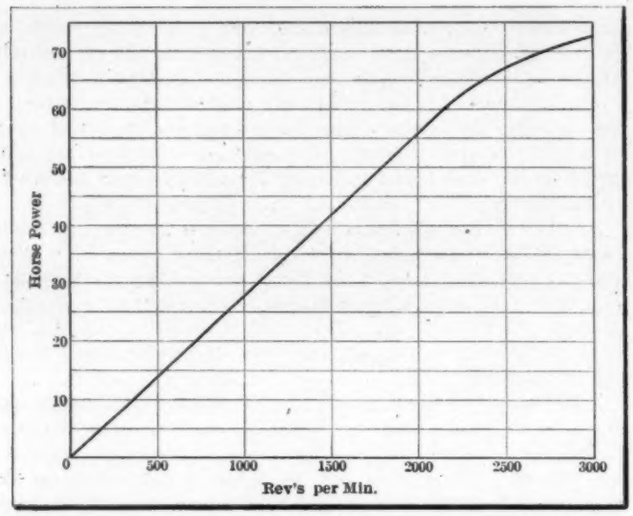


Fig. 1.—Power curve of a 3.3-inch motor, showing a remarkably steady rise

Engine Efficiency

AS an indication of the difference between the average stock model and the car that is specially prepared for racing purposes some figures recently published in England by the Austin Motor Company show what can be attained in the way of efficiency by special fittings to the motor. The piston speed of a motor is dependent in a measure upon the weight of the reciprocating parts, and it has been the aim of designers to make these as light as possible consistent with the stresses and strains they are compelled to undergo. Pressed steel has been adopted of late years for the pistons on some racing motors, but one disadvantage of this method of manufacture lies in the fact that out of a dozen blanks several are often found to be faulty. This enhances the initial cost and would be too dear a proposition for stock cars. However, when the cost is not a matter of importance there is no doubt that the steel piston is lighter than the conventional cast gray iron variety.

The pistons of the motor under consideration were steel and together with their wrist pins and rings weighed 1 pound each. Connecting rods weighed 1 1-2 pounds each and the motor was a four-cylinder monobloc with a bore of 85 millimeters (3.34 inches) and a stroke of 115 millimeters (4.527 inches).

The power curve of the motor shown in Fig. 1, which is reproduced from *The Autocar*, indicates a remarkably steady rise up to 2,300 revolutions per minute, when it falls off only very slightly and continues to 3,000 revolutions, registering 72 horsepower at that speed.

Fig. 2 shows the possible speeds of a car fitted with this motor. The gear ratios are as follows:

First speed.....	9.7:1	Third speed	3.9:1
Second speed	5.0:1	Fourth speed	3.0:1

The ignition used on the motor under test was one that gave two sparks at the same moment, and two carbureters were employed.

Two Sets of Advice on "Knocking"

When the well-known knocking sound is heard from the automobile, and it cannot be ascribed to loose connecting-rod bearings, several other possible causes may be looked into. The staybolts of the magneto may have become loose, in which case the magneto is likely to rock on its bracket and produce the sound of knocking.

A tooth in the camshaft gearing may have been broken.

The fan belt, if one is employed, may strike against one of the fan blades.

The hood may be loose and knock against its support or against the radiator.

An exhaust pipe joint may be loose, and the exhaust will then regularly produce a sound similar to that of a crankshaft knock.

The valves may be noisy, by the design of the valve cams or too much play in the valve lift mechanism.

The joint of an inlet pipe may be loose, causing too much air to enter the cylinder affected, and this will cause real knocking, even if the connecting rod bearings are tight.—From *La Pratique*.

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The same subject is treated in another publication at greater length and, as it seems, with some variance in the diagnosis of the trouble. This doctor says:

The knocking may come from the crankshaft bearings, from the camshaft bearings and from the camshaft gears. The location of the cause can in these cases only be decided by a complete dismounting of the motor. It is better to look for other possible causes first. A badly seated valve or too much play in the valve control may be at the bottom of the trouble. Next, the flywheel should be examined; it may be rocking on its keys. A fouled or cracked spark plug or a poorly connected wire may be at fault. An experienced driver, however, will have no trouble in distinguishing the noises from the ignition or the carburetion system from real knocking.

If the knocking comes really from the motor or the flywheel, it continues of course if the motor runs while the clutch is out, and this is the way to try it.

If there is knocking with the change-gear lever on neutral and the clutch in, and the knocking stops when the clutch is disengaged, the cause is necessarily in the clutch, the intermediate shaft or the primary shaft of the transmission. The latter may knock from wear of bearings or when it has become misaligned with the motor shaft through twisting of the vehicle frame. Such misalignment will soon ovalize the bearings, and it is therefore of no use to remedy the knocking by relining these, unless the misalignment of the frame is first corrected. The ever extending use of a universal joint between the clutch and the transmission box now almost eliminates this cause from the possibilities by rendering a misalignment harmless.

The intermediate shaft comprises sometimes a bearing mounted in one of the cross girders of the frame. There, too, if there is misalignment, knocking may follow. And these forms of knocking, as well as those arising from a too stiff or too loose clutch, be it a metallic Hele-Shaw or Mercedes band clutch or a leather-

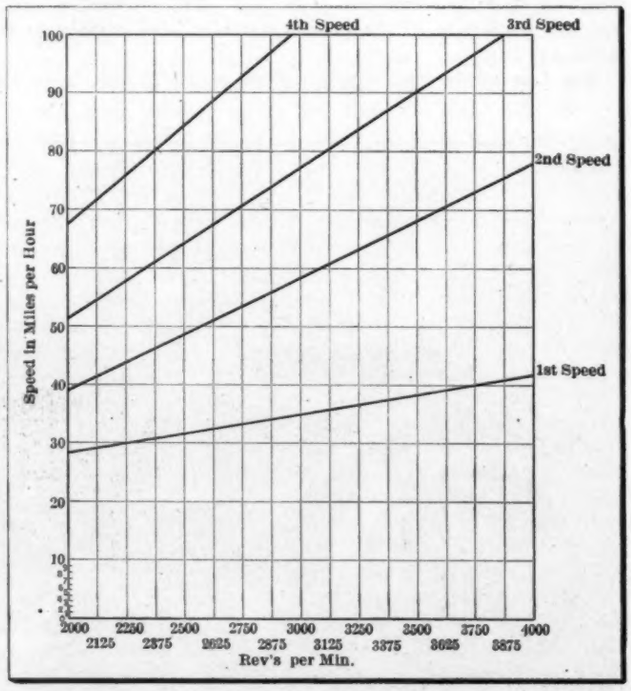

Fig. 2—Diagram showing the speed in miles per hour of a car fitted with a 3.3-inch bore motor

faced cone, resemble closely that from a loose connecting-rod bearing. In the case of the Hele-Shaw clutch, shortage or excess of oil or even only the poor quality of oil is sufficient for producing the same effect. The remedies are obvious.

Suppose that one hears the knocking while the vehicle is running, but that it ceases when the vehicle is stopped and the motor turns without load. It may be that the motor is nevertheless the cause. Some motors knock even when everything is in normal order, as soon as the spark timing is no longer in accordance with the motor speed; but, barring this exceptional case, the sound must come from the transmission, from the driving shaft or from the brakes. The sound in these cases is an entirely different and much less frequent one. Its origin may be found by raising the rear end of the vehicle, resting it on a box for example, and running the motor. By engaging the different gear speeds successively and applying the brakes while immobilizing one wheel and then the other, the trouble is soon located. And, if only an adjustment is involved, as in the case of the brakes, it is also soon remedied.—From *La Vie Automobile*.

Motor Gangploughs

WHILE the makers of continental Europe seek inspiration for the development of agricultural motor machinery in the productions of England and the United States so far as machinery of high cost and high power is concerned, which is best adapted for agricultural operations on a large scale, it is found in all countries that the development of machinery which can be used with real economy by farmers controlling only a limited acreage (and that usually of high price), represents a separate problem or rather a series of separate problems. It has been found especially difficult to devise gangploughs which will do the heavy work demanded of them, under all conditions of surface, soil and weather, with the limited power and small weight of the equipment which are indispensable features for keeping the first cost as well as the cost of operation and maintenance down to a practical minimum.

Professor Dr. Strecker of Leipsic reviews the main construction features in the machines which have been offered in the market with a view to the solution of these difficulties and with special reference to machines driven by gasoline motors. The English Ivel-Motor, weighing 1,500 kilograms and equipped with a 20-horsepower motor, has been found too weak for the work of drawing gangploughs, depending for traction as it does on chain-driven rear wheels alone. The French Bajac tractor of 25 horsepower is designed to draw a three-share plough weighing 1,100 kilograms. In light soil 2 1-2 hectares (6.178 acres) can be worked 20 centimeters (7.8 inches) deep in 10 hours with a consumption of 60 liters (13.2 gallons) of benzol. With a two-share plough weighing 1,000 kilograms 1 1-2 hectares of similar soil have been worked 36 centimeters deep using a slightly smaller amount of fuel. The possibility of deep ploughing under less favorable soil conditions is secured by a winch with a cable capacity of 200 meters. If the soil is so heavy that the motor cannot move the tractor and the plough at the same time, the tractor moves ahead alone unwinding he cable which has been attached to the plough, and, when as far as 200 meters ahead, it is halted and anchored by means of suitable brake arrangements, and then the plough is drawn to it by switching the motor power to the winch. This machine has three gear speeds, the high giving 15 kilometers per hour or 4 meters per second. The cable is wound up—drawing the plough—with a speed of 1 meter per second. The cable can of course also be used, in case of necessity, for pulling the tractor alone out of a slough or mire.

The Deutz gangplough weighs 8,000 pounds and operates four shares. Two plough beams each carrying four shares, are suspended from the machine, one in front and one at the rear. Only one set is in operation at one time, the arrangement having for its object to avoid the onerous and difficult turning of the whole equipment at the end of the furrows. By means of a provision for placing both pairs of wheels askew, the machine can be moved laterally the width of the work, whereafter the shares which were in front are let down and the machine moves in the opposite direction, the driver's seat being reversible. When the work is too heavy for the wheel adhesion, a cable is strung across the length of the field being attached to special anchoring vehicles at both ends and passed several times around pulley sheaves on the machine. Ordinarily these sheaves revolve idly, but when necessary for drawing the load they are switched into gear with the motor, and the machine then pulls itself and the plow slowly forward by this means, as a chain steamer draws itself up against a swift current by means of the chain laid down in the river. The equipment costs 27,000 marks and has not yet found extensive employment, though in trials which were held under favorable conditions it proved economically satisfactory.

The Stock-motor plough, in use on many large German estates

The Stumpf motor plough weighs 12,000 pounds with a motor of 60 horsepower and a four-share plough and costs 38,000 marks. Traction is secured by broad and large driving wheels to the circumference of which are attached four rows of leaf springs, each spring secured at one end and extending almost tangentially and carrying at the free end a shoe or block which bends the spring to conformity with the rim when it strikes the ground—a system which, it seems, would be liable to be clogged up in wet and sticky soil.

The most interesting and strictly German development is shown in the "Stock-motor" plough which is in use on about forty German country estates and seems to be looked upon as very satisfactory. (The *Automobil Welt* states that it is little known only because the company manufacturing it is averse to all publicity with regard to its construction features.) The motor and the plough are built into a single frame. The 4-cylinder, 42-horsepower motor is mounted considerably in front of the two driving wheels which are over 6 feet in diameter and provided with traction blocks. The driver sits on the plough and alone attends to driving, steering and regulation of the ploughshares of which there are six. At the extreme rear a single steering wheel serves to determine the depth of the ploughing (apparently by adjustment of its height in relation to the plough frame), while the driver seems to be able to raise each individual share from his seat. The width of the work is about 5 feet and the machine is capable of turning over from 2 1-2 to 3 morgen (a morgen is 0.631 acres) of land every hour at a depth of 30 centimeters (12 inches), and the fuel consumption is figured as 4 kilograms (5.7 liters) of gasoline per morgen, which equals 2.06 gallons per acre. The price of the machine is 15,000 marks and it is said that it works well on hilly ground while still leaving something to be desired where deep ploughing of very heavy soil is wanted.—From *Automobil-Betrieb*, Oct. 15.

MORE BUSES IN LONDON—Ten automobile omnibuses form the average weekly addition to those already in service on the streets of London. Cab horses are being sold off at the rate of 200 every two weeks, and within the next year it is believed that the horse will be entirely supplanted by the motor bus. The latest available figures show about 1,500 buses in service and 1,600 horses.

The Runabout as an All-Winter Car

WHEN a number of automobiles form the complement of a private owner, that justly popular and handy type of little car known as the runabout is sure to be included. When it is the only car in the owner's garage it is frequently compelled to do duty usually reserved for larger cars. It is in its character as an all-round car that this article has to deal. The runabout is essentially a car for the business man's personal use; the ever-ready means of locomotion for the physician, while for suburban use it is made to do all kinds of work, from hauling baggage to and from the station, to carrying its owner and his family to an evening reception.

With the modern runabout the power is generally in excess of the actual requirement, and there is no good reason why an ideal Winter car cannot be made of it by the addition of a complete coupé body, or by adding the necessary upper structure to the body already on the car in order to get the coupé effect. The additional weight will range from 200 to 400 pounds. Some excellent effects can be arrived at if care is exercised in changing a runabout to a coupé. The design should be harmonious with the original parts of the body, and in changing the car it should always be borne in mind that when Summer comes around again the body must be put back in its original shape.

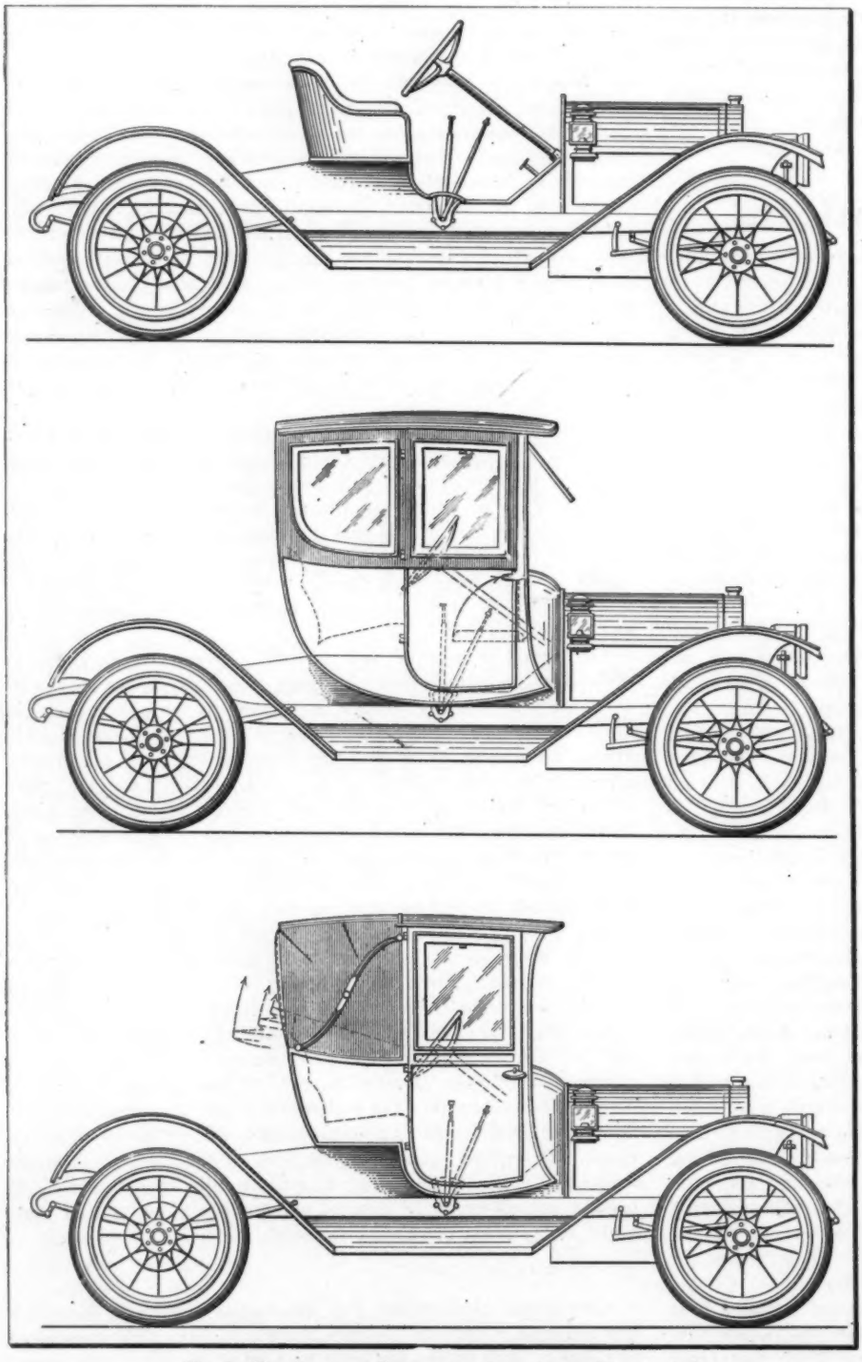

Fig. 1—Showing an ordinary type of runabout with open body
Fig. 2—Same car with seat removed and fitted with a coupe body
Fig. 3—Semi-collapsible landaulet body fitted to the same car

The method employed to effect the change is illustrated on two styles of runabout bodies, three designs being set forth. In Fig. 1 is shown an ordinary runabout body, while in Fig. 2 the same car is shown with the seat removed and a coupé body placed in position. The place that is left free by the removal of the seat is the principal support for the coupé body, the width of which is such that the sides come over and outside of the runabout body and enclose the levers. The dash is of one piece with the body, the original dash being removed. At the rear the coupé body fits close down to the deck, and at the lower part of the sides a metal strip is fastened to the coupé rocker, extending in to the runabout body and closing up any gap through which cold air might otherwise enter.

The coupé is really an envelope over the runabout chassis, the doors permitting of easy entrance from either side, while the glass frames can be made to drop if desired. It is recommended, however, that the door glass only be made to drop and the front glass made to swing outward in order to get the rain visor effect. The side and rear glass frames should be stationary to insure protection against cold and possible rattling. There is ample seat room for two passengers, while a fold-up emergency seat could also be installed, the latter being on the left side only. When in use its occupant sits crosswise of the car and leans against the door; when not in use the seat folds up under the cowl as indicated by the dotted lines in Fig. 2. The body as illustrated in this figure has upper panels of wood, the lower panels be-

ing of metal. The framing is also of wood. It should be made as light as possible, not only to facilitate removal and replacement as the seasons change, but also to prevent overloading of the car, excess weight for a body of this description being in the nature of a crime, for it must be remembered that, especially in the rural districts, the service demanded of the transformed car calls for long trips over roads which are at their worst when the car is most needed.

In Fig. 3 is shown another type of body that can be fitted to the runabout shown in Fig. 1. It is a semi-collapsible landaulet, and the rear part of the top falls as indicated by the dotted lines and arrows. When not in use this top leaves the body open from the back of the door. The dimensions of the body and the seating will be the same as in Fig. 2; the door frames can be dropped, and the front glass frame raised to secure proper ventilation when the weather is not too inclement.

The possibilities of body designs that can be grafted onto the runabout are limited only by the will of the owner. Almost any design can be made to look well, but the best effects are gained where the entire body is put on as illustrated in Figs. 2 and 3.

In Figs. 4 and 5 are shown a regular fore-door runabout before and after the imposition of an upper structure that converts it into a coupé for Winter use. In this combination design the entire lower body remains, the upper or cab part being built to conform to the shape and design of the original body. It is attached at the top line of the seat door and cowl. The door is made continuous by this joining, and the two parts are made to work as one. The hinges must be in perfect alignment, and the regular lock on the lower part is fitted with an outside handle.

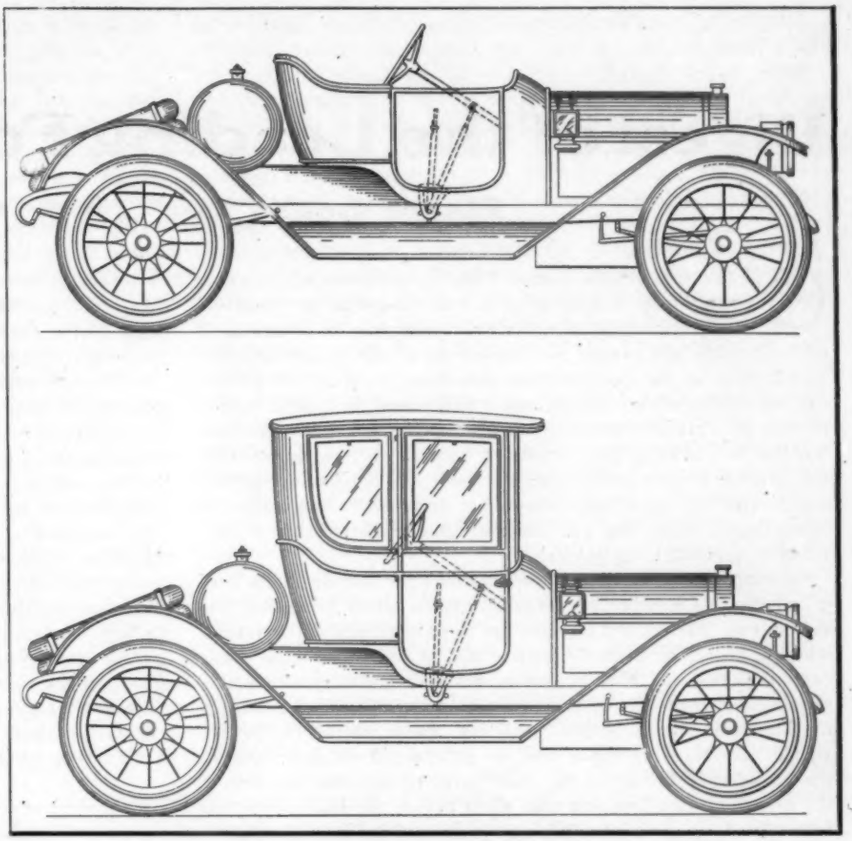

Fig. 4—Ordinary type of fore-door runabout for warm-weather use
Fig. 5—Same car after upper part has been added to convert it into a coupe

In making this upper structure care should be exercised to have it conform to the shape of the lower body; in fact, it is hardly possible to make it except by using the lower body as a pattern. It is constructed of a light wood frame with aluminum panels and mouldings. The side and rear glass frames are stationary, but the front glass can be swung out, as is the usual custom with closed bodies, and the door glass can be lowered a few inches for purposes of ventilation.

The seat room for passengers should be about the same as that allowed in Fig. 2, and the use of a small fold-up seat is generally an advantage in all bodies of this type. The finish of the upholstery and the inside trimmings should conform to that on the runabout as it came from the factory, but it should be as light and as plain as possible on the new part of the body. The trimming on Figs. 2 and 3 should be of cloth, this material being much more comfortable for Winter use.

There are now on the market several other methods of converting an open-body car into a closed one—by the use of curtains, for instance—but the most satisfactory arrangement is something along the line illustrated, as this gives a substantial enclosure that will resist rain, and that will allow of entrance and egress without sliding under dripping curtains.

Europe's Governments Subsidize Automobiles

Continental European Governments are taking a deep interest in the development of the automobile, a fact which gives great encouragement to manufacturers. This applies particularly to motor trucks, the owners realizing that if they would obtain a subsidy, they must maintain and operate the trucks in such a manner as to get at the accurate cost of such work. Besides, owing to the subsidy in question, manufacturers are careful to build their motor-trucks under direct supervision of technical representatives who are assigned by the War Departments of the respective countries. The respective Government then contributes a sum equivalent to $1,000 for the initial purchase of the car, $250 yearly, for five years, towards the operation and maintenance of the truck which will be turned over to the government in the event of war.

Mexico Doubles Automobile Imports

The demand for foreign-made vehicles of various kinds is rapidly growing in Mexico, as is shown by the annual report of importations which has just been issued by the federal government. During the fiscal year 1910-1911, ending June 30, vehicles were imported to that country to the value of $9,062,679 as compared with $5,754,194 for the preceding fiscal year, an increase of $3,308,484. It is claimed that but for the revolutionary disturbances which caused a general suspension of business for several months the importations for the last fiscal year would have been much larger. The present year promises a very material increase. The growing values of the vehicle importations is due largely, it is said, to the increase in the demand for automobiles. While these cars are purchased largely of American manufacturers good orders are constantly going to Europe.

Digest of the Leading Foreign Papers

Flame Leaks and Their Causes

ON the first Prince Henry Tour in Germany in 1910 one of the cars belonging to B. von Lengerke, an engineer, took fire while going at full speed and its owner took pains not only to examine into the causes of the occurrence, but also to look up the circumstances attending all other fires affecting automobiles and aeroplanes which came to public notice thereafter. He arrived at the result that in by far the greatest number of instances the carbureter bore the blame, or at least was instrumental in propagating the flame and igniting the grease and lubricating oil usually allowed to accumulate in greater or lesser degree in the drip pan under the motor where a fire is particularly difficult to extinguish.

Relating the result of his investigations the author states that a considerable number of aeroplanes have taken fire when the motor was started, in addition to those well-known instances where it broke out while the aviator was in flight, and in all these cases the cause can have been none other than a tongue of flame slipping out from one of the combustion chambers and reaching the vapors in the carbureter. All the causes which may be assigned for this occurrence may be generalized as one, namely, the momentary failure of the inlet valve to lock the fire within the cylinder. Ignition may take place before the inlet valve has been closed, or the inlet valve may be opened before the exhaust has been completed and while flame-hot gases are still present in the cylinder head.

This may be due to a momentary sticking of the inlet valve, or else to a peculiar design of the cams, meant to reduce valve noise in high-speed motors, in conjunction with over-advancement of the spark, and in this connection it is worth noting that carbureter fires were very frequent on the Prince Henry Tour of 1910, in which scarcely any cars participated that were not equipped with motors with a very high number of revolutions per minute, and that these occurrences were explained, not only by the author but also by other professional automobile engineers of high standing, as due to the extreme reduction of the time intervals between the motor periods, in some instances amounting to overlapping. At 2,400 revolutions per minute or more, designers experience the greatest difficulties in providing for precision in the reciprocating valve movements, as perfectly well known, and every factor which may retard or obstruct these movements may lead to the liberation of a tongue of flame.

As other possible causes for the phenomenon, leaking valves and sudden defaulting in the gasoline supply may be mentioned. A clogged jet, for example, may cause a very weak mixture whose ignition and combustion are likely to be so much delayed that the explosion period of the motor will blend into the exhaust period, with the consequence that, at the end of the latter when the inlet valve is again opened, high-tension gases still remain in the cylinder head.

With reference to fires which have been occasioned by starting of the motor, it is evident that the backfiring which is by no means uncommon when motors of high power are started (though the explosion may be weak) may send a small flame out through the inlet valve which has been reopened through the reversal. On the other hand, the induction of a poor mixture—usually accompanied by a pop—and the retarded combustion of such a charge, with the consequences already referred to, may, of course, occur at starting as well as at other times.

That similar effects may be produced through unintentional ignition is perhaps self-evident, and it is not only conceivable but it has been repeatedly proved that such untimely ignition may be caused by defects in the ignition device. The popular notion that fires are often due to leaks in gasoline ducts or to poor insulation of the electric wiring can, on the other hand, in nine cases out of ten, not be substantiated.

A flame from the inlet valve ignites naturally first whatever ignitable mixture may be present in the induction pipe and in the carbureter and then attacks any combustible substance which may have been precipitated around the jet. Now, if there are corners, corridors or cavities in the carbureter where fuel can accumulate to any extent—and a surplus discharge from the jet or jets may be due to violent bumping of of the vehicle or irregularity in the nozzle action—the possibility always exists that the normally harmless carbureter fires may be carried by a current of air and in the form of burning drops of gasoline to combustible substances in the drip pan.

These gathering places for precipitated fuel which therefore constitute the chief cause of fire risk are found in the majority of carbureters in which the air channel extends at right angles with the jet, but in some instances the designers of carbureters of this type have realized the danger and have taken special

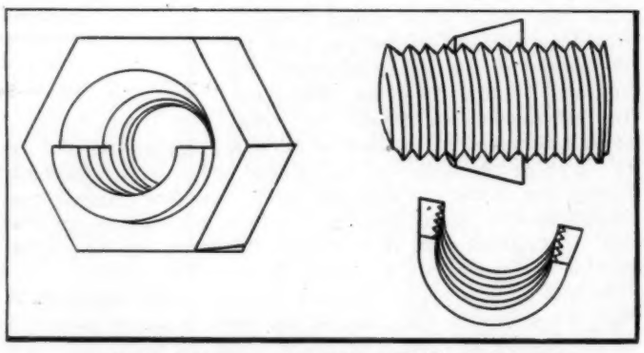

Fig. 1—Locknut for short bolt—a British improvement

measures for circumventing it. A simple expedient for the avoidance of such accumulations, and one employed especially in carbureters in which dashpots and slides are among the features of design, consists in a drain hole at the lowest place, but this provision is after all only a makeshift, for if a carbureter is inclined to slopping with the gasoline at certain motor speeds it is easily possible that a flame could ignite a drop of gasoline which was just trickling down through the drain, thus carrying a conflagration even more rapidly than usual down into the vapors and oil puddles underneath; and if this happens either a good fire extinguisher or a mass of loose sand, right at hand, is required for averting damage.

The author closes his diagnosis of the possible causes of fire leaks from the cylinders of an internal combustion engine with remarks intended to obviate any exaggerated apprehensions on the part of automobile users, while admitting that he now always carries a fire extinguisher himself when going out on a trip of some length. And, he adds, he would rejoice if designers of carbureters would take pains to remove the objectionable feature to which he refers. Manifestly his facts and arguments also bear upon the leading issues: Slide valves versus poppet valves and long stroke versus short stroke, the long stroke giving longer intervals between valve actions for a given piston speed.—From *Der Motorwagen*, Oct. 20.

A Good Lock for a Short Bolt—Where a bolt is to be secured the locknut shown in the drawing, Fig. 1, affords, it is claimed, perfect protection against even such vibration as may loosen the customary combination of washer nut, jam nut and split pin—by shearing the pin or stripping the bolt thread—and it makes possible a shorter bolt than may ordinarily be used, resulting in a neat finish and in a minimum projection from the joined parts. The nut has a deep conical bore into which is seated a split nut the exterior surface of which is turned with a corresponding taper. It is apparently the split nut which abuts against the joined part when the main nut is fully tightened, while the small end of the split nut abuts against a shoulder in the main nut. It is said that the grip of this nut is strong even on a bolt whose thread has been partially stripped, owing to the wedging action of the conical surfaces.—From *The Commercial Motor.*

Water Tube Joints—A neat device for making and remaking of the flexible joints of the water circulation system, between the radiator and the motor, consists in a ring with knurled external flanges A. A. and an oblique transverse slot B as shown in Fig. 2. Two of these rings clamps are required for each joint, being fitted one to each end of the rubber tubing F, which is used for connecting the metal pipes. The ends of the rubber tube must be cut off squarely, so that the ring may be turned around on its seat with its retaining flange C rubbing against the end of the tubing. The joint is made with the aid of a length of tape D, the end of which is inserted in the slit till caught between the rubber of the tube and the interior cylindrical surface of the clamping ring. The latter is now turned around and draws

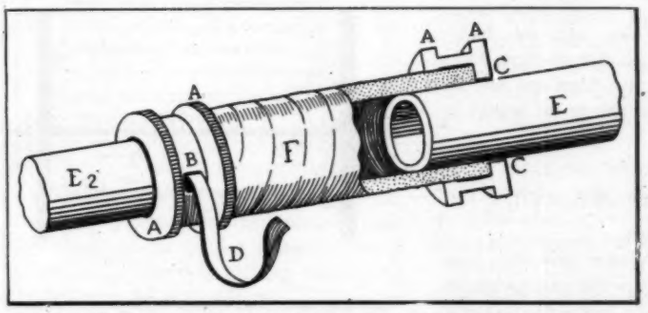

Fig. 2—Neat water tube joint—clamp at one end shown in section.

the tape with it squeezing it harder and harder against the tube the more of it is drawn in, and consequently at the same time squeezing the rubber tubing against the metal pipe E. As the circumferential pressure obtained by this method is very even, it is not necessary to screw the ring up very tight to get a joint which holds. The tape is now cut off and a slight additional twist is given the ring to remove the tape from sight. To unmake the joint, the ring is simply turned in the opposite direction, the tape always appearing through the slot, unless it has been turned in too far.—From *The Autocar*, September 23.

Fused Silica for Plugs and Goggles—One of the Cantor lectures organized by the Royal Society of Arts of Great Britain had for its subject: "Rock Crystal; Its Structure and Uses" and was delivered in May this year by Alfred E. H. Tutton, M. A., D. Sc., F.R.S. It dealt largely with the intensely interesting scientific and artistic applications of this substance whose field of usefulness for laboratory work, optical instruments, including spectacles and microscopes, and various practical purposes has been immensely enlarged since it became possible by means of the electric furnace and the oxy-hydrogen flame to fuse it in quantities and to produce from it articles of almost any desired form and size.

The fused quartz thus produced has been found to differ from the rock crystal of nature in many important properties. When, for example, quartz of a specific gravity of 2.651 is fused, the solidified cooled quartz glass has only the specific gravity of 2.21, and the coefficient of expansion, though almost imperceptible beforehand from any viewpoint but the scientific one, is also reduced to the vanishing point. While rock crystal is slightly brittle and subject to fracture from mechanical violence —though not from changes of temperature—the fused quartz is so tough that an article made from it is seldom broken or chipped when dropped on the floor.

The possible use of fused quartz for spark plugs and perhaps even for the interior lining of motor cylinders or rotary internal combustion engines seems to be foreshadowed in the qualities of the substance, so that the subject gains at least a speculative interest, also from the standpoint of the automobile user and manufacturer.

An excellent and immediate test by which quartz may be told from common glass is derived from its coldness to the touch. Spectacle makers are well known to discriminate between ordinary glass lenses and the so-called "pebble" lenses made from Brazilian quartz pebbles by the cold feel of the latter when placed on the tongue. This property is ascribed to the high thermal conductivity of the quartz, which is combined with almost absolute refractoriness to electric currents, making it an excellent insulator. It is almost unbreakable, withstanding changes of temperature which would at once shatter glass, and it is far less readily attacked by acids excepting hydrofluoric, than either glass or porcelain. Its elasticity is well-nigh perfect and it can be wetted in contact with water only with the greatest difficulty; which would recommend it for driving spectacles and goggles. Quartz begins to soften at a temperature of 1,500 deg. to 1600 deg. centigrade, in the neighborhood of the melting point of platinum, and can be worked by skilled men at a temperature somewhat higher. Fused silica glass articles are now being manufactured by two British and two German firms.—From *The Journal of the Royal Society of Arts*, Oct. 27.

Solidification of Gasoline.—In discussing means for reducing the fire risk in aeroplanes, the technical committee of the Automobile Club de France recently approved a proposition made by a military member to the effect that a competition should be organized for judging the merits of various methods for absorbing gasoline in some solid substances which will give it off in vapor or otherwise when exposed to a current of atmospheric air.

The German experiments were cited by which gasoline has been turned into a firm transparent jelly, capable of being cut into blocks and handled with tongs and other tools, by treatment with stearic acid, hydrochloric acid and caustic soda; and also the methods used, particularly in the United States, for absorbing large volumes of acetylene gas in porous solids. Finally it was recalled that the Society for Saving the Shipwrecked last year had requested the club to experiment at its laboratory with a tropical wood called Bolandero said to be capable of absorbing large quantities of gasoline, and that it had been found that this wood in reality does absorb 210 grammes of gasoline in 52 grammes of its own weight and retains it under a mechanical pressure of up to 0.219 kilograms per square centimeter of its surface, whereafter it exudes.—From *Bulletin Officiel*, September.

The Lubricating Oil can be Burned Smokelessly just as well as the gasoline, but much more air is required for this purpose than for burning the gasoline alone. The great art is to get along with as little oil as possible, so that there may be oxygen enough in a cylinderful of air for complete combustion of the gasoline charge as well as the oil. Most automobilists, when the motor acts sluggishly, by reason of over-oiling, turn on more gasoline, while they should turn on more air and reduce the oil feed.—*Automobil-Betrieb*, Oct. 15.

Letters Answered and Discussed

The Editor invites subscribers to communicate their automobile troubles and personal experiences, stating them clearly on one side of the paper. If the nature of the case permits, send a sketch, even if it be rough, in order to assist to a clearer understanding. Each communication will receive attention in the order of its receipt, if the writer's signature and address accompany it as an evidence of good faith. If the writer objects to the publication of his name, he may add a nom de plume.

Mixture Too Rich

EDITOR THE AUTOMOBILE:

[2,908]—I have a 1191 car. When it runs slow up to 12 miles an hour it pulls fairly well, but when I open the throttle wider it starts to miss. I have examined the intake manifold for an air leak and also have had several experts try to adjust it, but they do not seem to help it any. When I stop the engine, gasoline drips from the carbureter for about a minute, then stops. Would you kindly tell me in your next issue what the trouble is and how to fix it? G. W.

Albany, Wis.

Evidently your carbureter is out of adjustment and you are getting too rich a mixture; that is, there is too little air in proportion to the amount of gas in the charge which is admitted to the cylinder. It may be that the air inlet is clogged with dust or grit, or that the tension in the air valve spring B, Fig. 1, is too great. First examine the air inlet for dirt, then adjust the air valve by means of the thumb screw A. This adjustment should be made while the motor is running at a moderate speed, the screw A being turned until the best motor performance possible is obtained. After doing this try reducing the size of the spray orifice slightly by means of the adjustment provided for that purpose, as it may be that the opening is too large, causing the slight flooding which you mention.

All such carbureter adjustments should be made carefully and systematically. On page 587 of our issue of October 5, 1911, will be found general directions for performing them, which may be of service to you.

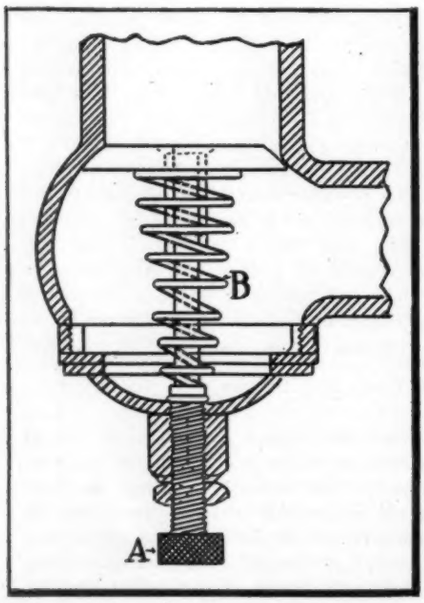

Fig. 1—Section of carbureter showing air inlet valve

Cleaning Reflectors

Editor THE AUTOMOBILE:

[2,909]—How can I repair the reflectors of my auto searchlights? They seem to have become dull from the heat of the flame. Can I get a ready-mixed preparation and apply it myself, or must I have new reflectors? I am a constant reader of your magazine and would appreciate any information you can give.

Holstein, Ia. A. W. SCHMIDT.

If your reflectors are not too badly smudged up you may be able to clean them with alcohol. In case this does not remove the dullness the best thing to do would be to replace them.

Anti-Freezing Solutions

Editor THE AUTOMOBILE:

[2,910]—Will you please tell me how much calcium sulphide to use per gallon of water and will it do any harm by standing in the radiator? This is used as an anti-freezing solution. W. B. WHITE.

Zelienople, Pa.

The use of the chemical which you mention for the purpose is not recommended. We are of the opinion that you mean calcium chloride, which makes a very good anti-freezing solution. The water in this solution, however, evaporates, and about once a month the specific gravity of the mixture should be checked up because if allowed to become too strong the calcium chloride will precipitate and clog the cooling system.

The best way to make the solution is to first make a saturated solution of the chloride, and then add water to it until the desired mixture is reached. This is done by taking half a gallon of water to eight pounds of chloride for each gallon of saturated solution required. It is a good idea to make a gallon or so extra to have on hand. You can tell if this makes a saturated solution by observing if some of the crystals remain in the bottom undissolved. If this is not the case add more crystals until some of them will not dissolve. This solution is made applicable to the cooling system by adding to it more water, and finally, when the right proportion is obtained, a handful of lime to render it slightly alkaline. The latter is done because this solution is said to have an acidic action on the metals of the whole cooling system. As the latter has been proven, the simple precaution of adding the lime will counterbalance it.

Fixing a Damaged Radiator

Editor THE AUTOMOBILE:

[2,911]—Apropos of the series of "Best Repair" articles you have been publishing, my experience with a damaged radiator should prove interesting to some of your readers.

A small boy threw a stone while I was traveling at about 20 miles per hour and hit my honeycomb radiator. The cost was a new radiator, but that would not get me home and I had several hundred miles to travel on very important business.

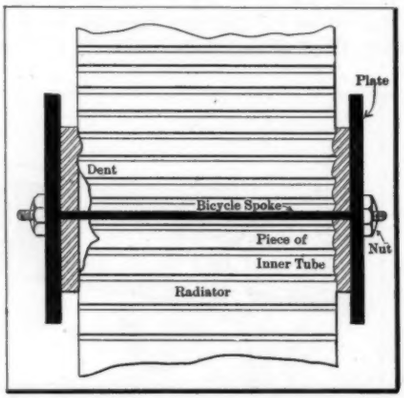

Fig. 2—Showing how a honeycomb radiator can be temporarily repaired with a bicycle spoke, piece of inner tube and a piece of metal

The nearest village of any description was 2 miles away, and I found that there was a bicycle repairer there. I had an old inner tube in the car and proceeded as follows: I cut two pieces of rubber from the tube about twice as large as the dent and with the aid of two pieces of wood placed back and front of the radiator and some rags interposed between the rubber pads and the board I managed to bind the board together with copper wire.

Needless to say this did not hold water very long, but it served long enough to get 2 miles without losing all the water.

Fig. 2 shows the method I employed of executing a repair, which carried me to my destination without further trouble, and for several weeks afterward. I located the repairmen and had him cut a bicycle spoke

to the length indicated by me, which was sufficient to pass through the radiator. One end was already threaded and he threaded the other end. The illustration speaks for itself. Tightening up on the nuts compressed the rubber of the inner tube over the orifices of the tubes and was entirely satisfactory.

I treasure the part even to this day and I carry them on the car in case I ever have a leaky radiator tube again.

Removing Tight Wheels

Editor THE AUTOMOBILE:

[2,912]—Will you kindly tell me through your columns the best way to remove the rear wheels of my car? I have made several unsuccessful attempts to get them off, but since they are keyed to the axles and I have no wheel remover it appears to be a hopeless job. Any suggestions which you can offer will be appreciated.

Buffalo, N. Y. M. E. ROWE.

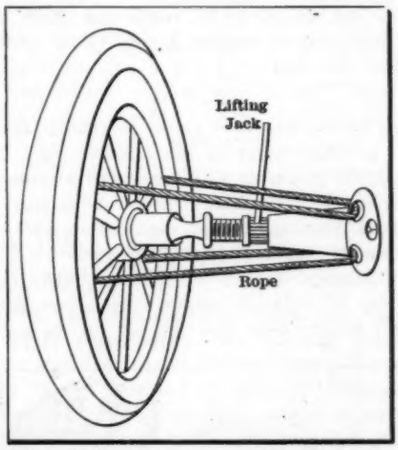

Fig. 3.—Method of removing tight wheels

Wheels may be removed by following the procedure illustrated by Fig. 3. The hub cap is first taken off and a stout rope is put around four of the spokes as near to the brake drum as possible. Then a lifting-jack is screwed down to its smallest length and placed with its head against the axle, or, as is shown in the illustration, the head is placed against a block of hard wood which touches the axle. The rope is then fastened around the base of the jack and when the latter is screwed up the wheel should come off without any difficulty.

Cleaning Carbon Deposits

Editor THE AUTOMOBILE:

[2,913]—When the cylinders become dirty with an accumulation of carbon, grease, etc., what is the best and quickest method of cleaning it out? Can it be burnt out without damage to the engine? If so kindly tell me just how this is done.

H. T. OFFTERDINGER.

Washington, D. C.

The surest way to get rid of carbon deposit is to remove the cylinders from the crankcase and then to scrape off the accumulation with a hard, sharp-edged tool, being careful not to scratch the cylinder walls during the operation. At best, this is a rather long and tiresome job, but the improvement in the power developed and in the running of the engine afterward will compensate for the work expended.

Kerosene, or, better still, some of the so-called carbon-removing compounds, will remove the softer part of the deposit, at least. Some of these will dispose of even the harder formation also, thus cleaning the cylinder quite well. Kerosene does not generally remove the hard carbon, although if allowed to stand in the cylinder over night it becomes more effective. In using the prepared carbon removers which are on the market the directions for their use will be found accompanying them. The accumulation cannot be burned out of the cylinders.

Making Auxiliary Air Port

Editor THE AUTOMOBILE:

[2,914]—Will you please illustrate in your columns some method for rigging up an auxiliary air port apparatus which will be adjustable from the driver's seat? A friend of mine has applied such an adjustment to his car and I have been wondering if it would be possible for me to do the same thing, as it seems to add greatly to the power of his car on hills.

Neoga, Ill. MECHANIC.

An apparatus which has been successfully used for the purpose is shown by Fig. 4. This gives a very good hand control of the extra supply of air and leads to fuel economy. The valve is placed in the intake manifold as indicated. The sketch is self-explanatory.

Storing Cars in Barns

Editor THE AUTOMOBILE:

[2,915]—I had intended to store my car for the Winter in a country barn within which horses are kept. A friend called my attention to what he termed the fact that, owing to the proximity of horses, it would mean the ruin of the paint and varnish upon my car. He was so positive about it that I hesitated very much about carrying out my plan. Have you ever heard of such a thing? And, generally, what do you advise? It is not a question of cost, as the barn is no less than a garage, but I am sure of care and perfect protection in the one case and extremely doubtful about it in the other. GEORGE E. HYATT.

New York City.

The varnish on an automobile is very sensitive and unless the barn in which you are contemplating storing the car for the winter is light, airy and free from dampness, we would not advise your placing the car there for such an extended period.

Coal gas and gas which sometimes percolates through heating pipes will in time cause a very bad form of spotting. Ammonia gas which is of common occurrence in stables and barns is also known to be injurious to the varnish. The form of spotting here mentioned may be recognized by the dull, lustreless spots, showing a film of greasiness which afflicts the surface. Damp and ill-ventilated garages are the cause of a great deal of this spotting, which is very difficult to remove. Pure, fresh air brought into the storage quarters of the automobile in a sufficient quantity to counteract the accumulated foul air, fetid odors and gases, will, however, generally prevent spotting and loss of luster.

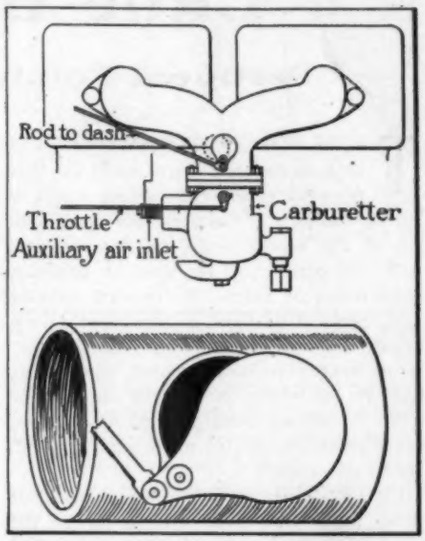

Fig. 4—Hand control of auxiliary air valve

In storing automobiles in places such as you mention, it is therefore advisable to have the quarters well ventilated and lighted; also to cover the cars with suitable cloth covers, thus preventing a great deal of dust and dampness from reaching them. In general it might be added that the average barn is not suitable for the storage of a valuable automobile.

Regarding Acetone

Editor THE AUTOMOBILE:

[2,916]—Can you offer me through your columns information concerning the composition and nature of acetone, and is its use and manufacture controlled exclusively by patent rights? J. W. TAYLOR.

Atlantic City, N. J.

Acetone is a well-known volatile, liquid chemical compound with the formula CH_3COCH_3. It is usually obtained by the distillation of certain acetates, such as starch, gum or sugar, and is used to dissolve many organic compounds. The use and manufacture of acetone except in connection with certain manufacturing appliances used by acetylene gas makers are not controlled by patent.

Little Bits of Motor Wisdom

Pertinent Pointers of Interest to Repairman and Driver

TOOLS FOR TESTING WORK—Few tools in the shop are of more use than try-squares and the various forms of spring calipers. Calipers are employed where the accuracy of the measurement will not permit of the use of ordinary steel scales or rules. Micrometer calipers and standard or limit gauges must of necessity be applied in cases requiring extreme fineness of measurement, often being used to get results as close as .001 inch or less. A delicate touch and good judgment are essential to skilful manipulation of all forms of calipers.

Fig. 1 illustrates the various types of these tools and their application to the work. At A are shown what are called keyhole calipers, these being used to measure from the side of a hole to the edge of the work; inside calipers are represented at D; outside calipers at C, and at B are seen a pair of spring dividers. Keyhole calipers are also of use in measuring the throw of a cam, the thickness of the shell of a tube, or in determining whether or not the hole in the work is central. The manner of using the other forms is obvious. In using spring dividers, after locating the center, incline them slightly in the direction of revolution and describe the circle. Be sure that the surfaces to be measured are perfectly clean before applying the calipers. This is especially important with the finer measurements. In making very large circles, for spacing and the like, extension dividers or trammels are used. For all ordinary work in the repair shop measurements can be made with a steel scale. These are accurate, and when skillfully used are second only to micrometer and vernier calipers.

Try-squares have several very well known uses, among them being to test for squareness of stock such as B in Fig. 4. In this connection it might be mentioned that D is the try-square proper and C the "beam." When testing for the flatness of surfaces, hold the try-square and the block B up to the light and tip the blade toward you so as to form a line contact between the two surfaces. If no light shows along the blade of the square, the surface is true. A bevel-edged square is sometimes used to get this line contact for fine work. This is shown at D, Fig. 2. To make sure that a surface is absolutely plane it should be tested both along its length and width and diagonally.

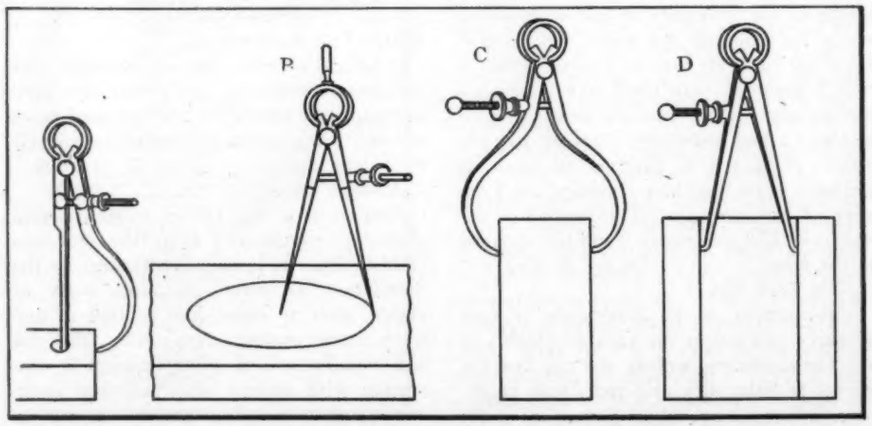

Fig. 1—Illustrating the different types of calipers and their typical uses in making accurate and necessary measurements

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BOLTS REQUIRE ATTENTION.—It is frequently the case that after traveling over cobblestones or other rough roads nuts will jar loose even if fastened by means of a lock nut. A split pin or castellated nut should always be used if the position allows of this practice. In placing a nut upon any part of the motor with a long wrench or spanner it must always be remembered that some day it will have to be removed. With a long leverage immense turning force can be applied to a nut, but it is not necessary to exert the fullest strength of which a man is capable in placing a spark plug in a cylinder or tightening a hub cap nut.

Rust is often a factor in preventing the removal of nuts which have been subjected to moisture. In this case the application of a little heat, either from a gasoline torch or from some gasoline which has been soaked up in a piece of cotton waste and wound about the joint, will aid the refractory member. Prevention in any case is better than cure, and if the thread is coated with graphite before tightening it will always be easily removable and will never give any trouble in the direction of rust.

The wise automobilist will generally carry one or two bolts and nuts of the size most used in his motor, if he be going on any extended trip where garages will not always be in reach and there is a likelihood of repairs having to be made upon the road.

OVERLOADING THE CAR—It is evident that the average passenger automobile, which is designed primarily as a vehicle of pleasure, should not be overloaded. A five-passenger touring car of medium weight is perfectly capable of taking care of all the baggage a party of five need take on a trip of ordinary length. But when this limit is stretched and the car on its way through the country has the appearance of the old-fashioned ship of the desert it cannot be reasonably expected to perform its work with any degree of comfort to the passengers. The springs and suspension of the car are designed for a given load, and a certain percentage is allowed as a factor of safety and to take care of any reasonable amount of overload. But a very uncomfortable vehicle can be made of the best of cars by overloading to such a degree that the shocks which are given by the irregularities of the road surface are transmitted directly to the occupants of the car.

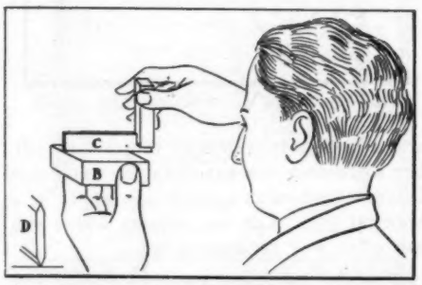

Fig. 2—Testing the flatness of a surface plate with a try-square

In loading the car compactness must also be made an object, not alone for convenience of the occupants, but to insure the easy riding qualities of the car itself. It is therefore advisable for the occupants of a car when starting on a tour to remember that it is of great importance to carry as little as possible, and to carry that little compactly.

HAMMERS FOR SPECIAL WORK.—The ordinary flat-headed variety of hammer cannot be used for the various pieces of work which will arise and for which a special hammer must be called into requisition. Peening operations will require hammers of different shapes, depending upon the requirements of the particular case in point. As shown in Fig. 3, the heads of the hammers will be formed so that when it is desired to indent the metal or bend it to a certain form the work may be much shortened by the use of the correct hammer head.

The ball peen as may be seen by its shape is not so much for lumping the material as it is for spreading it and hence thinning it out in the vicinity of the point at which the

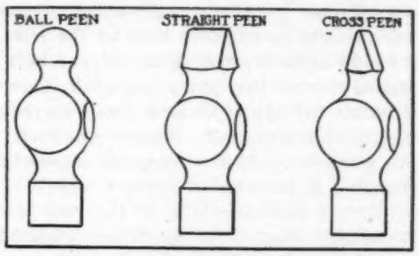

Fig. 3—Three different shapes of peening hammer heads

blows are directed. The cross peen and straight peen heads may be used interchangeably as the difference between them lies in the fact that the lines of direction of the heads are at right angles to each other. They are designed for the purpose of beating the metal into varying thicknesses or in some cases for spreading it about a given point.

TEMPERATURE OF COOLING WATER—The temperature of the cooling water will vary under different conditions under which the car is running. In mounting a hill with throttle open and retarded spark the charge will be much more slowly burned and the cylinder will have far less chance to be cooled between explosions. This will result in heated cylinder walls and hence in much warmer water. It is not an uncommon thing to have a steaming radiator after climbing a long steep hill on high gear.

In running along a level road the temperature of the cooling water ought not range much above 180 degrees Fahrenheit, so that when it is necessary to negotiate rough or hilly country there will be a sufficient margin before reaching boiling point to allow for any of the changes in temperature which take place. In Summer there will also be a marked tendency for the cooling water to become overheated on account of the air which is drawn over the radiator being so warm that it has very little cooling influence. In Winter the problem is entirely different and becomes one of keeping the water warm enough. In many cases the motion of the car is sufficient to cool the radiator sufficiently for all purposes and the fan belt can then be detached so that it is not in use. A nicer way would be to have a fan which has a variable pitch, so that it may be regulated to suit the requirements of the temperature of the locality and season.

It is not desired to cool the motor to a very great extent, as every unit of heat which is thrown into the cooling water represents a loss of power. Every gallon of cooling water which is raised 10 degrees in temperature in a minute represents the loss of approximately 2 horsepower. This seems like a very large quantity when it is considered how often the temperature of the cooling water rises and falls, and it is a large quantity, for fully one-third of the horsepower which is contained in the fuel supplied to the engine is lost in cooling the motor. It is therefore evident that it is a serious loss when too much of this heat is thrown away by having the cooling water at a higher temperature than is necessary.

USING CHIPPING HAMMERS—Every repair man and driver is familiar with the various types of chipping hammers. Nevertheless a few hints as to their use may not be amiss. Simple as the operation may seem, there is quite a knack in getting the most out of the hammer blow. The handle should always be grasped firmly near its end, so that the blow can be controlled, and the arm should be swung from the elbow. The chipping of metals is most commonly done when they are dry. Start with short, light strokes and increase to long and vigorous ones as the work progresses. When chipping out key-ways, grooves or slots, the chisel will cut better if wiped off occasionally with a piece of waste saturated with oil. When chipping a surface always fasten the piece in the vise horizontally, if possible, and use a packing block to prevent slipping. Begin the cut by holding the chisel parallel to the surface of the work and take off the first chip with a sharp blow. For succeeding cuts the chisel should be inclined somewhat. The manner in which the chips come off affords a means of determining the kind of metal that is being worked. If the material is hard cast iron the chips will fly off, while if steel or wrought iron they will curl up in front of the chisel. Chipping is rather a makeshift operation at best and should be resorted to only when no machine tool is at hand.

LONG BEARING A GOOD FEATURE—It is a serious fault to have bearings in a machine or any length of shafting of insufficient area to amply support the weight and other live strains which the shaft will be called upon to support. With the great tendency to save weight in the motor by various means the length of the various bearings should be well considered, and an intending purchaser should be careful in this respect, for it is of vital importance. There are certain rules for the dimensions and spacing of bearings which cannot be neglected, so that when the cylinders of an engine are cast

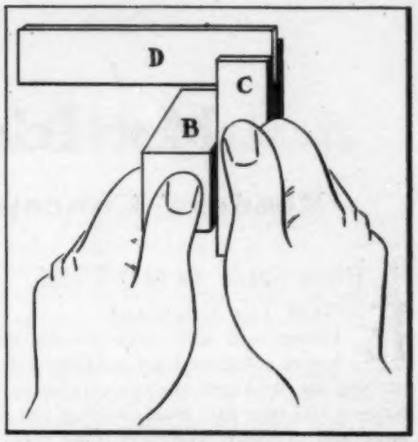

Fig. 4—Testing stock for squareness before using it in machine

in pairs the length of the bearings between the two blocks of cylinders must be sufficient to compensate for the greater length of shafting between bearings, or, what amounts to the same thing, the fewer bearings for the same length of shaft.

A shaft with a long interval between bearings will have a decided tendency to whip. By this is meant that the shaft will tend to form a loop in the same manner as when a string with a weight at the center is twirled about the two points of support at its ends. When this motion commences, it will gradually increase and result will be serious wear on the end of the bushings. Long bearings will go far in preventing this evil, but they are without the desired effect if they are not backed up by a shaft sufficiently thick to withstand bending stresses.

A shaft is classed in mechanics as a simple beam, and the calculations involved in determining the proper thickness of the shaft and the length of the bearings are amply summed up in formulæ which take into consideration the horsepower transmitted and the distance between supports. The maximum explosive force of the gas in the cylinder is taken as the working stress and a considerable factor of safety is allowed on account of the severe stresses to which the shaft may be submitted.

In a well-balanced motor the stresses on the crankshaft are so well distributed that the whipping tendency is reduced to a marked degree. This balance will go a long way toward eliminating the vibrations of the engine and will produce a smooth-running engine instead of a machine which rocks and tosses under unbalanced forces. The balance of the engine is maintained often by distributing the weight in the flywheel or in putting counter-weights upon the crankshaft so that all the large forces which are not directly connected with driving the motor are met by equal forces, which are caused by the revolution or reciprocation of these parts. Other and more complex methods of engine balance involve the changing of the connecting-rod angles. The efforts spent upon balancing the engine are well repaid, and make the engine no more costly to manufacture.

My Ideal 1912 Automobile

Readers' Conceptions of What Next Year's Car Should Be

Reasonable $1,000 Ideal

EDITOR THE AUTOMOBILE:

I have read with much interest the letters you have been publishing describing the ideal cars of some of your subscribers and note that most of them run to large and expensive machines. Last year I drove a six-cylinder 40-horsepower touring car and a very light runabout. This year I am still driving the six, but exchanged the runabout for another popular-priced light runabout and cannot speak too highly of the faithful service, in all sorts of weather, that these little fellows have rendered, the one I have having averaged 1000 miles a month since March and having had but the slightest care. A considerable part of the distance has been cross-country work.

Based on experience with these three cars, I believe in a light, low-priced car if honestly built. It should have a 3¼-inch by 4½-inch six-cylinder, four-bearing engine developing about 30 horse-power. The engine and transmission should be a unit, with the cylinders cast together as in the Ford L-type heads with enclosed valves. The crankcase should have large hand holes with readily detachable covers. The thermo-syphon system of cooling should be used with a fan-bladed flywheel on the front of the engine, and a high-tension magneto with fixed advance and no batteries. The oiling should be by splash in the crankcase, the level being maintained by filling from time to time. A hand throttle on the steering wheel with foot accelerator works excellently. The clutch should be of multiple-disc type in an oil bath. There should be three speeds forward and reverse, sliding gear transmission with the control in the center of the car, one pedal to operate the clutch and service brake on the propeller shaft and another pedal to operate the emergency brake on the rear wheels with ratchet to lock same in position. The wheelbase should be 110 or 112 inches, with four full-elliptic springs, axles well braced and 34 x 3½ clincher tires.

The body should be of the straight type with relatively low seats, and a knapsack type of gasoline tank back of the rear ones. I have used both right- and left-side drive and have no preference. The rear wheels should fit on the rear axle on a taper with lock nut and key. Steering knuckles, yokes and connections should be of ample strength—they look very frail on most light cars. All shackles, spring joints, knuckles and the like should be fitted with little spring-covered oil cups.

All moving parts and accessories, such as oilers, pumps, fans, sight feeds, self-starters, complicated electrical work and the like, should be made as few as possible. Such a car as I have outlined should be flexible, light, with more speed and power than necessary, simple to operate and to keep in tune, and, if honestly built, should last a long time and give extensive service.

Based on the selling price of the host of little cars that are coming into the market, I should think "my car" could be sold for $1,000 or a little over. NOVICE.

Mineola, L. I.

Another Youngster's Idea

Editor THE AUTOMOBILE:

The following is a general outline of my ideal 1912 car: The engine should have four cylinders of the L type, cast singly, with copper jackets. The motor should have a bore of 5 inches and the stroke should be 8 inches with 2¾-inch valves. These valves should be enclosed so as to exclude grit. This construction will give full 40 horsepower according to the A. L. A. M. rating and on a brake test will develop about 75 horsepower.

There should be a five-bearing crankshaft and camshaft, the bearings being of bronze or babbitt metal. Lubrication should be by positive force feed, the oil being contained in a tank at the side of the motor with a sight feed on the dash. The ignition should be by two independent Remy magnetos with two sets of Bosch plugs over the valves. The cooling system should consist of a honeycomb radiator with a gear-driven fan and a water pump.

Selective type of transmission should be used with four forward speeds and reverse, with direct drive on third speed, and geared 2 to 1 on direct. The clutch should be of the cone type, fitted with cork inserts. The car should be shaft driven and should have a Timken-Detroit rear axle, roller bearings being used with it. The front axle should be of the B. & L. castor type.

The exhaust should have two complete systems of outlet, consisting of a muffler fitted with a cutout and open exhaust pipes coming through the hood. The wheels should be similar to those which Ray Harroun used in the 500-mile race and should be 40 inches in diameter, shod with 6-inch tires front and rear. There should be four large brakes on the rear wheels, two internal and two external. The wheelbase should be about 140 inches and the car should be equipped with semi-elliptic springs front and rear, and should also have Hartford shock absorbers. Steering should be of the worm and sector type, with a 20-inch wheel, hard rubber and corrugated.

The body should seat two people, seats being on the floor, with 10-inch cushions and high backs, similar to those used on the Mercer raceabout. A 50-gallon gas tank should be mounted back of the seats. I would desire a combination Klaxon horn, engine-driven tire pump, Gray & Davis dynamo, full set of Gray & Davis torpedo electric lamps and a Warner autometer. An extra tire and rim complete should be mounted in the rear of the gas tank.

The car should be built of the very best materials. Such a car as I have outlined would cost about $5,500.

OLIN M. VAN NEST.

German Valley, N. J.

Specifies Full Electric Outfit

Editor THE AUTOMOBILE:

My conception of the ideal locomotive is as here given.

The motor should have four cylinders, probably cast singly with a unit construction including motor, gearset and clutch. The suspension should be three-point and the cylinders of the T-head type. The valves should be enclosed. The motor should have a bore of 4 1-2 inches and a stroke of 5 1-2 inches. The cooling water should pass through a honeycomb radiator.

The power should be transmitted to the gearset by means of a leather-faced cone clutch equipped with spring plungers for easy engagement. The gearset should be of the four-speed and reverse type with dirct drive on third; the shafts should run on ball bearings.

The propeller shaft should not be less than 14 inches in diameter and should transmit its power to a driving axle of the same diameter. The rear axle should be braced by means of special tension and distance rods.

The frame should not measure less than 3 x 5 inches at the midship section, and there should be as near as possible one-third of the frame between the front end of the rear spring and the rear end of the front spring.

Among the accessories I would have an electric generator for lighting as well as ignition, and an electric self-starter. The dash outfit should include a gasoline gauge.

The price of this car should be $2,500.

Kingston, N. Y. EXPERIENCE.

Sizing Up the Used-Car Situation

THERE are few lines of business that the automobile public in general knows less about—but thinks it knows more about—than the second-hand car trade. The reason therefor is that every motorist, comparatively speaking, has at some time or other had an opportunity to either buy or sell a used car, or to at least witness or hear about such a transaction. A single experience of this kind will usually enable a man to form a decided opinion about the situation. But let it be said that this throws a sad light on the reasoning power of a man thinking in this fashion, for there is no more complex situation than the problem offered by the vast number of used cars that are waiting to be disposed of, nor are there many lines of trade in which a thorough acquaintance with the conditions that obtain is so indispensable as in the second-hand car business.

It cannot be denied that this trade, if it is to be done profitably, must to a certain extent be regulated by a system. But, strange enough, the system used in this line of endeavor, however important, is an invisible one; that is, while it exists without a doubt, and while the business is carried out according to well-regulated principles, there is practically no time or work expended on any kind of filing system specially adapted to the requirements of the situation. Instead of this the ability of the men handling the work in every detail is principally relied upon in order to make the best possible out of the problem facing the dealer.

The second-hand car business has been repeatedly denounced of late by makers and agents; it has been called a nuisance and worse, and there have come about a dozen proposed solutions from various men prominent in the industry. But, considering the situation cooly and without bias, the observer will be impressed by the fact that as long as the vast production of yearly models of automobiles is continued the types out of date but still alive will have to be disposed of if their present owners are to be persuaded to buy new, and, in a good many cases, better and costlier cars. Nor is there any use in decrying any particular phase of the second-hand trade as it is now conducted, or to advocate any Utopian solutions of this problem. Here, as in so many other fields, the wisest course is rather to bear the ills we know than fly to others we wot not of.

The used car trade is handled in different styles by different men. There is hardly a firm in the metropolis which does not trade in used cars of its own make as long as these automobiles are in a salable state. In many cases this is regarded as necessary, for otherwise the prospective purchaser may buy another make of car from an agent who is more accommodating. Of course there are some makes on which such a transaction is impossible because of their low prices, but this very fact makes it improbable that a purchaser will demand his old low-priced car to be taken in and stand pat on his proposition after its unreasonableness has been explained to him.

One way of meeting the second-hand car problem consists in disposing of the used car without either a chance of winning or losing on the bargain. This idea is carried out by a number of responsible New York firms. If a prospective has become interested in the make of automobile handled by the dealer in question the salesman in charge of the transaction naturally endeavors to close the sale. In a good many cases an old car stands in the way of the new one to be bought and the following arrangement is then resorted to: The purchaser pays the vendor the full price of the new automobile, with no deduction for the value of the old car the buyer wants to dispose of. The company selling the new machine agrees, however, to do all it can to sell the used automobile for its owner, with no profit whatever accruing to the agent. In some cases the salesman doing the business may even suffer a loss because it is up to him to sell the old car for its owner; but if he should find no time to do so, and another man closes the deal in his place, he will be obliged to pay that man a commission out of his own profit on the new car sold.

Other automobile agents, when selling a new car, take in an old machine and its value is deducted from the bill made out to the customer. It stands to reason that before trading in such an automobile the agent has his experts look over the used car and value it at what it is worth. The experts in the case are men who have been specialists in the second-hand car business for many years and who know just how much it will cost to put a car in a salable state and to sell it. The value placed upon it by the expert is deducted from the bill and there is no bargaining done. After the deal has been closed the car is repaired, if this is necessary, and then sold for the price that was allowed for it to its former owner. Few firms attempt to profit on an automobile thus acquired.

The state of affairs is different, however, when used cars are handled by dealers who trade in none but used cars. Evidently these men must be still more careful in their transactions in order to do a profitable business. In their line of trade, one would imagine, the use of a suitable system must be still more indispensable than in the case of an automobile agent who handles second-hand machines but occasionally. The truth is that the true second-hand car man uses the least amount of bookkeeping of all automobile dealers. Card files, in which a special card is devoted to each car bought, and on which the details of its repair are entered afterward, are seldom used. The shrewd second-hand car man has all his system in his hand. It is a flexible system at that, thus being of the most practical kind, and its essence is: Buy as cheap as possible and sell as quick as possible for as much as you can possibly get.

If the situation, as reflected by the action of the various dealers, is surveyed, one can hardly help agreeing that the second-hand car problem is met, in practice, in the most advantageous manner possible. The majority of car owners seeking to dispose of a used car will always first try to sell the car themselves. If this scheme does not work, then it is attempted to trade in the car when buying a new one. If the owner succeeds, all the better. If, however, he does not desire to buy another machine, or if the agent makes him understand that he cannot accept the car as part payment owing to there being but little chance of his selling the machine, the owner will surely hie him to the second-hand car man's den and patiently submit to what cannot be avoided.

But the average owner distrusts every used car except the one that he has to sell. This is one more case where a man fails to see the beam in his own eye, but is very keen in noting the mote in that of his brother. This, however, influences business but little. It goes on, and the man who fails to understand the conditions and to take them into account is invariably the loser in the deal. The conditions are simply these:

A used car never looks as good as a new one; hence the desire of a man to exchange his machine for the latest model. The average owner cannot afford to throw away a good car after a year or two, hence the necessity for its being floated into the second-hand market. The production of automobiles and the demand for new ones grows steadily; at the same time a vast number of used cars have to be sold, often for a price that would buy a pretty good new car which people prefer; hence the difficulty an owner experiences in selling his used car.

Among the New Books

MONOPLANES AND BIPLANES, by Grover Cleveland Loening, B. Sc., A. M. Published by Munn & Company, of New York. 340 duodecimo pages with 278 illustrations. Price, $2.50.

THIS work on the most up-to-date subject for scientific as well as unscientific curiosity, contains a great deal of industriously collected information about the mechanical details of aeroplanes, containing descriptions and illustrations of practically all the varieties which have flown and have come under public notice. The information seems to be reliable where the work involved on the author's part is only that of the conscientious compiler. The theories which were currently accepted among aeronautic students for many years before any "heavier-than-air" machines flew, are also rendered with fidelity, and these may be of value to the reader, in so far as they serve to suggest what a large number of questions remain to be investigated experimentally before any scientific basis for orderly reasoning may be said to have been created for the guidance of either constructors or students. The inquiring reader who is satisfied to trust his intuitive perceptions will, however, find the mere mention of the various theories helpful, even if he cannot subscribe to their correctness, and herein lies probably the main value of all the books on aviation so far published. Mr. Loening's book is in this respect no exception and may perhaps be considered as especially stimulating because the author's diction and reasoning combine to rouse the reader's critical faculties. Phrases such as "data is," "enabling the lines of future development to be pointed out," "one of the greatest detriments" or "the fact that aviation is reasonably safe can unquestionably be concluded therefrom"—all plucked from the author's brief preface—can scarcely be considered as reassuring when one is looking for the earmarks of that schooled mentality whose guidance on a difficult subject should be readily accepted as of presumptive value. When we read on page 21: "That air as a medium is similar in character to water is shown conclusively by the accompanying photographic results of the experiments on stream lines of air by Marey," some doubt is aroused as to the stringency of other conclusions accepted as scientific by the author. Something more than photographs would be required to prove that air, highly elastic and compressible, is comparable in any important relations bearing upon the subject of aviation to unelastic and incompressible water; molecular mobility being about the only property which the two mediums have in common, and that in very unequal degree. Chapter V begins with this sentence: "It is well known, from the investigations of Froude and others, that the frictional resistance of a body in water was great." And this is followed by: "By analogy it would seem as if the friction of the air would also be considerable." In the face of such logic so expressed, the discriminating reader loses heart, and not even the statement that the book was contrived with assistance from members of the faculties at the Columbia University suffices for upholding the respect which its scientific verbiage would seem to claim.

An example of glib reasoning is presented on pages 19 and 20. Here we read: "In the Summer, on a dry clear day, the high temperature causes a low density"—of the atmosphere—"and the pressure is light, so that the aeroplane experiences the least resistance, and therefore at this season travels at a higher speed." It is difficult to know, of course, what an "aeroplane experiences"—to use the author's strange anthropomorphic phrase—but the careful reader of this book of instruction may safely deny the validity of the "therefore." The action of the propeller on the rarefied air as well as the sustentation such air affords are decidedly matters to be looked into before it may be asserted that the aeroplane "therefore" travels at a higher speed in thin air. And on the same page 20 a superfluous diagram sorely maligns Sir Isaac Newton's memory in ascribing to him a preposterous notion of the manner in which a horizontal stream of air acts against a vertical plane.

The author's license to teach a science which does not yet exist and a practice which has not yet become so crystallized that information for to-day holds good to-morrow, seems to have been issued on a purely commercial basis, for which it is perhaps a valid excuse, however, that those of really scientific attainments generally refuse to write anything on the subject which the public would be willing to read.

WELDING THEORY, PRACTICE, APPARATUS AND TESTS; ELECTRIC, THERMIT AND HOT-FLAME PROCESSES. By Richard N. Hart, B. S. 181 pages with 93 text illustrations. Published by McGraw-Hill Book Company, New York. Price, $2.50.

The subject of this work is theoretically in a chaotic state while in practice the arts of soldering and welding are progressing from week to week with tremendous strides. Few are in a position to keep step with the developments, and as these are intimately connected with other forms of advancement in metallurgical insight and throw highly interesting sidelights on the properties of metals, their alloys and their impurities, the technically interested public have reason to thank Mr. Hart for his courage and resolution in seizing this subject in its flight, snatching it, one might say, from out of the workshops, the testing stations and the pages of periodicals and fixing it, in so far as it will consent to be fixed, in the pages of one short volume. Nobody concerned with the joining of metals or metal parts can help receiving valuable information or hints from its pages, and even those familiar with the general conditions for the malleability and the "flow" of pure metals and alloys, with the phenomena of "solid solution," the formation, destruction and reformation of metallic crystals under the influence of heat and hammering, and with the molecular transfusion which takes places between metallic substances in many instances if only intimate contact is effected under moderate heat, will not fail to find among the facts related by the author many which will broaden or deepen their understanding for all kinds of metal work. Still the information offered is essentially practical.

In this useful work some curious lapses are nevertheless observed, as where the cohesion between two perfectly plane and smooth glass plates (in reality due to atmospheric pressure) is compared to the partial weld which may be produced between two plates of iron highly polished and heated to a dark red, or where it is stated that " the ancient Greeks knew of it (silver) as the metal electrum, an alloy of gold and silver," as if the almost pure silver of many ancient coins had been unknown to them. Such easily avoidable flaws bear witness of haste, but on the other hand the terseness of the author's diction, marred only in a few places by grammatical incongruities or clouded sense, conveys a refreshing impression of a well-filled mind capable of checking off the second-hand information which is necessarily included by comparison with a good store of data verified through personal and practical experience. On the foundation supplied in this work it should be possible in a few years to produce a thoroughly systematized textbook and shop guide on the arts of soldering, brazing, welding and fusing—now blending into one—and upon the closely related methods for cutting metal by local fusion.

MECHANICS FOR ENGINEERS. By Arthur Morley, M.Sc. Published by Longmans, Green & Co., New York. 282 pages, 200 illustrations. Cloth, $1.20.

In this work the principles of mechanics are brought to the student in a clear, concise manner which will prove valuable to those who are studying the subject without the aid of an instructor. The work is amply illustrated by diagrams which bring out the points involved in a manner which renders them easily understood by the students of elementary mechanics as applied to engineering.

Kinematics, the study of bodies in motion, and statics, the study of bodies at rest, are taken up in the first part of the book, while the remainder is devoted to the laws of inertia and gravity, the moment of inertia and the elements of graphic statics. Relative examples and their solutions are given as well as examples for solution by the reader.

Harking Back a Decade

ITEMS appearing in *The Motor Review* of November 14, 1901:

An injunction has been issued by the United States Circuit Court in New York, restraining Frederick R. Wood & Son, makers of electric vehicles, from the use of the two-motor drive construction patented by the Electric Vehicle Company.

The Milwaukee Automobile Club has been planned and as soon as it is formed it will affiliate with the Automobile Club of America. Tours, social and sporting events will be arranged.

The recent tests in handling mail at Syracuse showed that the automobile could effect a saving of 66 per cent. in the time involved in collecting.

Actual sales at the Madison Square Garden show just closed totaled close to the $1,000,000 mark. The demonstration track around the exhibits was abandoned this year, but most of the exhibitors had demonstrating cars outside the building to give street rides to those who really meant business. The attendance was very steady throughout the show but at no time approached what would be considered a crowd.

The Franklin company, which has been experimenting with a four-cylinder, air-cooled motor which drives direct to the rear axle in high gear and with two forward speeds and reverse, is about to market its experiment. Four pedals control the brake, reverse, high and low speeds. The car has 28-inch wheels and weighs 850 pounds. It is rated at 7 horsepower.

The Diamond Rubber Company, of Akron, O., is erecting an addition to its plant that will increase its floor space to 500,000 square feet. The factory is one of the largest of the kind in the United States.

The Winton Motor Carriage Company will establish branch houses in Philadelphia, Boston and Chicago as the result of its increased capitalization. This move will be made next Spring.

The automobiles shown at Madison Square Garden one year ago were as a class shaftless carriages, a combination of the regular American carriage and a motor. The vehicles shown this year are very largely of the French type, which, to all appearances is rapidly winning favor with American owners, not as a foreign fad but on its technical merits and the appropriateness of the design to the required service as a pleasure locomotive.—Editorial.

The automobile world here is now goaded anigh to the revolutionizing point, and something must be done. The worst of it is that there no sort of appeal against the sentences of these bundles of crassly and conservatively prejudiced old women, and though the Lord Chancellor is believed to possess some power over them, I can recall no publicly known incident in which that power has been put into force.—London correspondence on conviction of automobilists for alleged speeding.

Fifty cars of the new model Stevens-Duryea car are under construction at the Chicopee Falls factory. Three of the test cars have been in use since last Summer with satisfactory results. The car has a two-cylinder motor, rated at 5-horsepower and is equipped with wire wheels.

W. J. Stewart, of Newark, N. J., driving a Locomobile, claims the long-distance speed record on a hill as the result of his climb of Eagle Rock near Orange. This hill averages 18 per cent. grade. Mr. Stewart's car made the climb in 2:43. The length of the hill is not given.

Eleven manufacturers of automobiles and eight accessory houses have already made application for blocks of space exceeding 1,000 square feet each at the Chicago Automobile Show, which will be held in the Coliseum March 1-8. All the available space has been snapped up and indications point to a show of far greater magnitude than the one of last season.

English "Driver" Ousts French "Chauffeur"

French motorists are up in arms owing to the fact that an English word has slipped into the French vocabulary and is becoming quite popular. Reference is made to the word "driver," which, to a degree, has supplanted the word "chauffeur." But it is a question whether those who have adopted it will abandon it. The same sort of protest was heard when the proposition was first made to change the road right-of-way from right to left, the latter being the English system. But the French people managed to survive the shock and "driver" will doubtless replace "chauffeur."

Calendar of Coming Events

Shows

Nov. 20-25.....Indianapolis, Ind., Fall Show, Indianapolis Automobile Trade Association.
Dec. 30-Jan. 6.....Buffalo, N. Y., Annual Show, Seventy-fourth Regiment Armory, Buffalo Automobile Trade Association.
Jan. 2-11.....New York City, Hotel Astor, Importers' Salon.
Jan. 6-13.....New York City, Madison Square Garden, Twelfth Annual Show, Pleasure Car Division, Automobile Board of Trade.
Jan. 6-20.....New York City, Madison Square Garden, Annual Show, Motor and Accessory Manufacturers.
Jan. 10-17.....New York City, Grand Central Palace, Twelfth Annual Show, National Association of Automobile Manufacturers; also Motor and Accessory Manufacturers.
Jan. 13-27.....Philadelphia, Annual Show, First and Third Regiment Armories, Philadelphia Automobile Trade Association.
Jan. 15-20.....New York City, Madison Square Garden, Twelfth Annual Show, Commercial Division, Automobile Board of Trade.
Jan. 13-19.....Milwaukee, Wis., Auditorium, Fourth Annual Show, Milwaukee Automobile Dealers' Association
Jan. 22-27.....Detroit, Mich., Wayne Gardens, Eleventh Annual Show, Detroit Automobile Dealers' Association.
Jan. 22-27.....Providence, R. I., Providence State Armory, Rhode Island Licensed Automobile Dealers' Association, Automobile and Accessories Show.
Jan. 27-Feb. 10....Chicago Coliseum, Eleventh Annual Automobile Show under the auspices of the National Association of Automobile Manufacturers. Pleasure cars, first week. Commercial vehicles, second week.
Jan. 29-Feb. 3.....Scranton, Pa., 13th Regiment Armory, Second Annual Show.
Feb. 3-10.....Montreal, Canada, National Show, Drill Hall, Automobile Club of Canada.
Feb. 5-17.....St. Louis, Mo., Coliseum, Annual Show, Pleasure cars, first week. Commercial vehicles, second week.
Feb. 12-17.....Kansas City, Mo., Annual Show, Combined Association of Motor Car Dealers.
Feb. 14-17.....Grand Rapids, Mich., Third Annual Show.
Feb. 17-24.....Newark, N. J., Fifth Annual Automobile Show, New Jersey Automobile Exhibition Company, First Regiment Armory.
Feb. 17-24.....Minneapolis, Minn., National Guard Armory and Coliseum, Annual Automobile Show, Minneapolis Automobile Show Association.
Feb. 17-24.....Pittsburg, Pa., Second Annual Show, Exposition Bldg., Pittsburg Auto Show Association, Inc.
Feb. 19-24.....Omaha, Neb., Seventh Annual Show, Auditorium, Omaha Automobile Show Association.
Feb. 19-24.....Hartford, Conn., Annual Show, Automobile Club of Hartford, State Armory.
Feb. 20-24.....Binghamton, N. Y., State Armory, Third Annual Show, Automobile Dealers' Association.
Week Feb. 22.....Cincinnati, O., Annual Show, Cincinnati Automobile Dealers' Association.
Feb. 26-Mar. 2.....Elmira, N. Y., Second Annual Show, Elmira Automobile Club.
March 2-9.....Boston, Mass., Tenth Annual Show, Boston Automobile Dealers' Association, Inc.
March 4-9.....Denver, Col., Auditorium, Annual Show.

Meetings, Etc.

Nov. 20-24.....Richmond, Va., First American Road Congress, under auspices of American Association for Highway Improvement.
Nov. 22.....Road Users' Day, under direction of Touring Club of America.
Dec. 20.....New York City, Waldorf-Astoria, Annual Banquet of the Automobile Club of America.
Jan. 18-20.....New York City, Annual Meeting of the Society of Automobile Engineers.

Race Meets, Hill-Climbs, Etc.

Nov. 27.....Savannah, Ga., Vanderbilt Cup Race, Savannah Automobile Club.
Nov. 30.....Los Angeles, Cal., Track Races, Motordrome.
Nov. 30.....Savannah, Ga., Grand Prize Race, Savannah Automobile Club.
Dec. 25-26.....Los Angeles, Cal., Track Races, Motordrome.

THE AUTOMOBILE

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A Foreign Solution

A FEW years ago when a car maker wanted more power he added to the cylinder bore and stroke; in some cases he added another pair of cylinders, converting the four-cylinder chassis into a six. Often when adding extra cylinder power more weight was added, heavier parts were deemed necessary to care for the additional power, and little thought was given to the matter of reducing the weight of the parts by the adoption of higher grades of steel. In those days if more power was wanted the only solution was more cylinder capacity. This system is changing very rapidly in America, and it has changed wonderfully in Europe. In America the demand for higher efficiency with reduced fuel and other expenses has not been so great as abroad. In England, where there is a tax on gasoline per gallon as well as a registration tax by horsepower, and where many of the buyers have a limited income on which to live and to operate the car, it is necessary for a car maker to practically guarantee the fuel consumption of his machine, to guarantee the hill-climbing ability, to guarantee the speed on level roads and to guarantee the probable tire mileage.

It has been necessary with the English builder, and with a great many French builders also, to give higher motor efficiency with reduced cylinder capacity and with a lower fuel consumption. This has caused the engineering departments to go to work. The result has been that they are using the long stroke abroad because it is more economical on fuel and gives more power proportionately than the shorter stroke variety. In America several of the makers who are to-day experimenting with the long-stroke types say they consume more gasoline than the square motor. It is quite natural that with experimental engines, as many of them are, the fuel economy factor should not be anywhere near the low-level mark. It will take a year or so before consumption is cut down to the minimum. Not only has the foreigner cut down fuel consumption, but he has increased the power.

The long-stroke motor has brought many problems along with it. One has been the reduction in the weight of reciprocating parts, meaning pistons, connecting-rods and wristpins. It is now customary in standard touring cars to fill the pistons below the wristpins with small holes varying in diameter from 1 to 2 inches. These perforations reduce weight very much. Other makers, instead of doing this perforation job, have adopted steel pistons. These steel pistons are stampings. They are very light and are very cheap to make. A little weight has been cut off the wristpins by making them of larger diameter and hollow. The connecting-rod weight has been very materially reduced in many ways. One maker uses a hollow rod. It is expensive, but strong, and the reduced weight gives a smoother running motor. The piston, wristpin and connecting-rod unit has to be stopped and started twice in every revolution of the crankshaft, and when a crankshaft is revolving 1500 revolutions per minute it means 3000 stoppings and 3000 startings of this weight in every minute of time. It takes power to start this weight in movement and increase it to a high speed, and it also takes power to stop it. The heavier these parts are the more power is consumed in this starting and stopping process.

It may be that some car users will say that with lighter reciprocating parts there will be more rocking or pivoting of the pistons and consequently more piston slap and motor noises. This might be true had the designer not anticipated the difficulty, but he has mastered the situation by adding to the length of the piston, so that with the reduced weight and increased length there is a steadier piston than formerly and there is a motor with less piston slap, and consequently less noise.

Much talk is indulged in as to what constitutes a long-stroke motor. Some American car builders advertise long-stroke motors when the bore is 4 inches and the stroke 4.5 inches. Such is not a long-stroke motor. The long-stroke motor should have the stroke at least from 25 to 40 per cent. in excess of the bore. Of the new models brought out in France and England this year the stroke-bore ratio averages 1.5 to 1. There are a few new motors with the stroke a good deal more than half as great again as the bore. There are two or three in which the stroke is double the bore, and one of the more progressive ones has the stroke-bore ratio at 2.75 to 1. Two years ago such constructions were considered racing monstrosities, but to-day it is different. The makers have refined on the racing creations of the past; some are marketing them as the regular product.

The American builder will find that manufacturing a long-stroke motor is not merely adding a few inches to the stroke and cutting off a fraction of an inch or perhaps an inch from the bore. The long-stroke motor is a new design. It is a new conception of a motor and not a working over of an old design. When the stroke-bore proportion is changed the lubrication problem is changed, the valve design problem has been altered, the carburetion work changed, and, in fact, the entire motor situation is altered. The long-stroke motor must be designed from the ground up. It is just about as sensible to make a long-stroke motor out of a square one, in the hope of getting a fair measure of success, as it is to take a touring car chassis and, by changing the gear ratio, transform it into a truck chassis.

Census Figures on the Industry

WASHINGTON, D. C., Nov. 13—A further preliminary statement of the general results of the thirteenth census of establishments engaged in the manufacture of automobiles, including bodies and parts, was issued to-day by Census Director Durand. It contains summaries which give the general figures, the number and value of machines by kind, for 1904 and 1909, and the horsepower rating by classes for 1909. The report was prepared under the direction of William M. Stewart, chief statistician for manufactures, Bureau of the Census. The figures are subject to such revision as may be necessary after a further examination of the original report.

The summary shows increases in all the items at the census of 1909 as compared with that for 1904.

The number of establishments increased 317 per cent.; capital invested, 653 per cent.; the gross value of products, 730 per cent.; cost of materials, 901 per cent.; value added by manufacture, 596 per cent.; average number of wage earners employed during the year, 528 per cent.; amount paid for wages, 580 per cent.; number of salaried officials and clerks, 682 per cent.; amount paid in salaries, 654 per cent.; miscellaneous expenses, 389 per cent.; primary horsepower, 647 per cent.

There were 743 establishments in 1909 and 178 in 1904, an increase of 317 per cent.

The capital invested as reported in 1909 was $173,837,000, a gain of $150,753,000, or 653 per cent., over $23,084,000 in 1904. The average capital per establishment was approximately $234,000 in 1909 and $130,000 in 1904.

The value of products was $249,202,000 in 1909 and $30,034,000 in 1904, an increase of $219,168,000, or 730 per cent. The average per establishment was approximately $335,000 in 1909 and $169,000 in 1904.

Weed Chains Win Another Battle

Another victory for the Weed Chain Tire Grip Company and the Parsons Non-Skid Company, upon the patents on which the former bases its product, was scored in the United States Circuit Court for the Southern District of New York, when Judge Lacomb signed an interlocutory decree affirming the right of the complainants in the patent and issuing a permanent injunction against E. J. Willis Company, of Boston, and waiving the prohibition so as to cover the Whitaker Chain Tread Company also.

The decree appoints Commissioner Shields to take testimony for an accounting between the parties and when that is done the decree may be made final. In the meantime the respondents have the right to appeal the case to the Circuit Court of Appeals, which will probably be done.

The Weed chain makers are in the midst of an extended battle to assert their rights under the Parsons patents and at this time there are still pending 175 suits against various alleged infringers of those patents. In this number of cases preliminary injunctions have been granted while several final decrees have been entered against individual infringers.

The amount of money involved in the present litigation is considerable but it has not been definitely determined and will not be until Commissioner Shields has finished hearing the testimony.

The interlocutory decree connects the Whitaker company with the respondent in this language:

"The E. J. Willis Company without right or license from the complainants making, selling and using chain grips known as the Whitaker Chain Grip made by the Whitaker Chain Tread Company, which has conducted the case of the respondent."

Frederick S. Duncan conducted the case for the complainants.

The patent under consideration is No. 723,299, granted August 24, 1903.

Government Investigates Naphthalene

WASHINGTON, D. C., Nov. 13—As a large part of the road work in this country seems destined to be effected by the use of tars in road treatment and construction, a systematic investigation of the effect of various constituents upon the adaptability of tars as road binders is now being made by the Good Roads Division of the Department of Agriculture. While definite conclusions are not announced, the results strongly indicate four determined facts, as follows:

That the fluxing value of naphthalene for tar pitches is somewhat greater, although quite similar, to the heavier naphthalene-free tar distillates, until the mixture becomes saturated with naphthalene.

That for the harder tar pitches the addition of very small percentages of naphthalene will produce a marked increase in fluidity of the resulting product.

That for the softer pitches the addition of naphthalene in small quantities causes less increase in fluidity than for the harder pitches.

Fifty-four in Savannah Road Races

Extending the time for closing entries to the Savannah road races until November 23 was decided upon yesterday in order to allow several belated entries to reach the authorities.

The list now contains fifty-four cars, divided among the four races as follows: Grand Prize—Benz (3), Fiat (3), Abbott-Detroit (2), Lozier (2), Marmon (2), Mercedes (2), Buick (2), Inter-State (2), Apperson, Ford and Pope-Hummer. Total, 21.

Vanderbilt Cup—Fiat (3), Lozier (2), Mercedes (2), Abbott-Detroit (2), Inter-State (2), Mercer (2), Marmon (2), Opel, Jackson and Ford. Total, 18.

Savannah Challenge Cup—Marmon (3), Mercer (3), Case (2), Ohio and Cino. Total, 10.

Tiedeman Trophy—E-M-F (3), Abbott-Detroit (2). Total, 5.

The course was thrown open for preliminary practice on Monday, and the circuit, which has been reduced to 17.14 miles has been pronounced faster than before by 5 miles an hour.

According to the officials there is a possibility of getting in ten more entries.

James M. Carples, of the New York Mercedes branch house, stated yesterday that the Mercedes entries in the Grand Prize are conditioned upon the showing of the cars in the Vanderbilt Cup race.

The New York official party, consisting of R. L. Morrell, referee, and his associates, left this morning for Savannah.

Knight Says Argyll Infringes

Cable advices from Coventry, England, declare that Charles Y. Knight has filed suit on behalf of his company against the Argylls, Limited, makers of the Argyll automobile. The complaint alleges infringement of the Knight patent covering the sleeve-valve motor in all its details. The new Argyll is equipped with a single-sleeve device which is given a reciprocating motion, while the original Knight engine has two concentric sleeves. In the Argyll the rotary valve principle is also combined with the reciprocation of the sleeve.

News of Shows—National and Local

THERE was a little more activity to be noted in the locai show situation during the past week than there has been for a month back. The decorative plans are being discussed, and while everything in this line is still tentative at best, the main ideas under consideration embrace the simplest plan of decoration ever used for an automobile show in the preparations of the National Association of Automobile Manufacturers for its display at the Grand Central Palace.

It would be painting the lily to go into any extensive decorations in such a show hall, as the architectural features of the building are so handsome without decoration that something would be detracted from their appearance by the copious use of bunting and lights.

The plan is to install panels over the windows, painted to represent autumn scenes, and to confine the other decorations to vines, greenery and potted plants.

At Madison Square Garden the scheme this year is still indefinite. Several ideas of decorations are under consideration. One of the favorites is an Egyptian theme, which calls for conventional effects and vivid colors.

Complete lists of the exhibitors at both shows are being prepared and will be issued as soon as possible.

The space allotments at the Palace have been revised several times, the latest change being made necessary by the withdrawal of the Colby & Babcock electric.

So far about forty members of the motor and accessory manufacturers and twenty-five independent makers have taken space in the accessory show, which will be held on the third floor.

All the space for the first week at Madison Square Garden has been taken.

Milwaukee Show Will Fill Auditorium

MILWAUKEE, Nov. 13—The entire Milwaukee Auditorium, affording more than 65,750 square feet of floor space, will be required to house the 1912 motor show of the Milwaukee Automobile Dealers' Association, which will be held from Jan. 13 to 19 inclusive. The main arena, which has heretofore sufficed to contain all pleasure car exhibits, will be supplemented by the arena basement, and the commercial vehicles will be placed in other large halls of the basement. The four smaller halls on the main floor will be used for accessory and parts displays. Bart J. Ruddle, 71 Sentinel building, Milwaukee, is manager.

Omaha Show February 19-24

OMAHA, NEB., Nov. 13—At a second meeting of the directors of the Omaha Automobile Show Association, it was decided to hold the Omaha show from Feb. 19 to 24.

It was decided to hold the show at the auditorium again as it is more centrally located than the Coliseum. But as the auditorium has been too small for the show for the last two or three years, it is planned to build a temporary annex on a vacant space to the south of the building, for the commercial vehicles. This will leave the main floor of the auditorium for pleasure cars.

As there have been thirty-three firms represented in this association, and twelve more are applying for admission, the 1912 show will be by far the largest ever given here.

Cincinnati Exhibit in Music Hall

CINCINNATI, O., Nov. 13—The Cincinnati Automobile Dealers' Association has definitely decided to hold the association's annual show in the north wing of Music Hall, this city, during the week of February 19 to February 24, for pleasure vehicles only and a separate exhibit for commercial vehicles during the first three days of the following week.

The committee chairman were appointed as follows:

Chairman of all committees, Edward F. Herschede; display, space, tickets, badges and program, Robert T. Crowthers; publicity campaign. E. A. Kruse; decorations, H. S. Leyman; halls and grounds, Frank H. Miller; heating and lighting, W. G. Welbon; concessions, George Behlen.

Show Dates for Providence

PROVIDENCE, R. I., Nov. 13—Dates for the Providence automobile show have been set for January 22-27. The State Armory will be the stage, and passenger and freight cars as well as accessories will be displayed. The floor space of the main hall is 38,000 square feet. The rules as framed are much the same as those in force at all the important exhibitions of automobiles. Arthur S. Lee will manage the show.

Pittsburg Leases Exposition Building

PITTSBURGH, PA., Nov. 13—The Pittsburgh Auto Show Association, incorporated, has leased Exposition building for their second annual automobile show from February 17 to 24, 1912.

The association held its annual election and elected the following officers and directors: E. A. Williams, president; Elias Lange, vice-president; Albert A. Buhl, secretary; Julian B. Howe, treasurer; J. H. McClarren, B. F. Benson, E. E. Gregg, James D. White and L. G. Martin.

As the association will have twice as many members to show as last year, it was found necessary to provide additional space at the Exposition so that all could properly show their cars and trucks. By going to quite an expense, it was found feasible to remove some of the permanent booths and thus provide extra room.

Thomas I. Cochran, who managed the Exposition automobile show for the association last year, has been retained as manager this season. Offices have been leased and fitted up in the Highland building.

Fifty-two makes of pleasure cars and 16 of the highest grades of trucks are handled by the members of this association. The automobiles and trucks will be shown on the same floor in separate aisles. The balcony is large enough to accommodate all the accessory dealers of this section.

The Exposition building is larger than Madison Square garden in New York; in fact, is the largest building used for show purposes in the United States. There is not a pillar or post in the entire building to obstruct the view or interfere with an exhibit.

Scranton Gets Ready for Show

SCRANTON, PA., Nov. 13—The Scranton Annual Automobile Show will be held in the 13th Regiment Armory from Monday, January 29, to Saturday, February 3, 1912, as the former show was cramped for room in the Town Hall. The 13th Regiment Armory, one of the best in the State, has been secured for the present show. Forty thousand square feet of floor space will be used, and nearly all this space has been taken. About 100 automobiles, and a large line of accessories, will be exhibited. Hugh B. Andrews, who so successfully managed the initial show here, will manage this year's exhibition.

How Chicagoans Will Sell Used Cars

CHICAGO, Nov. 13—Having worked on the problem for a month, the Chicago Automobile Trade Association today, at a general meeting of the association, adopted the report of the special committee appointed to look into the second-hand car proposition, which report had previously been carefully considered from various angles and then favorably acted upon by the directors.

The Chicago idea is different from those in vogue in other cities in that it does not attempt to bind the dealers by iron clad contracts—it simply furnishes a source of information which will be of value to the tradesmen in setting prices on old cars offered as part payment on new ones. The scheme as outlined is as follows:

First—There shall be established a bureau of information to be conducted under the direction of the directors of the association.

Second—The association shall have prepared blank forms arranged to receive a list of all models made by any one manufacturer for the year 1908, and each subsequent year, including model, number of passengers, type of motor, selling price when new, allowance price for each model in average condition, and resale price when thoroughly overhauled.

Third—These blanks forms shall be distributed to all dealers, and each dealer shall file such forms, properly filled out, giving the above information, with the secretary of the association.

Fourth—Thereafter on the first of every month each dealer shall file with the secretary a revised card showing any changes in prices or models.

Fifth—The association shall have copies of each report or revised report printed in quantity sufficient to furnish one or more to each member of the association; suitable loose leaf binder covers shall also be obtained, marked on the outside with the name of the association, in which a copy of each report shall be placed alphabetically arranged; a copy of these reports so bound shall be furnished by the association to each of its members.

Sixth—The association shall furnish each member with a printed copy of each revised report thereafter filed with it by any dealer; and for this purpose the association shall employ a messenger whose duty it shall be to deliver these revised reports to each member, personally placing the new sheets in each binder, and returning the old sheets to the secretary of the association.

Seventh—These binders shall be the property of the association at all times, and shall be renewed by it whenever necessary.

Eighth—A committee of three members of the association shall be appointed by the president each year immediately after the election of officers.

Ninth—It shall be the duty of this committee, whenever any member fails to file the reports provided for by these rules, to obtain, by any means that they may consider appropriate, sufficient information to enable them to prepare and file with the secretary a report similar to a dealer's report, which shall be received in lieu of the report of the particular dealer.

Tenth—Whenever any member shall sell a second-hand car, such member shall immediately report by mail to the association, filling for that purpose a blank form, to be furnished by the association, which shall read as follows:

"I, today sold.....second-hand car model..... number of passengers..... price when new..... for $.....; Signed..... Dated....."

Eleventh—The association shall have compiled weekly a list of all sales of second-hand cars reported each week, model and price, and a printed copy of this list shall be mailed to each member; the names of the dealers selling the cars shall not be made public, but kept on file by the association for its records.

Twelfth—The association shall also obtain information from all possible sources to enable it to print weekly a list of the number of the various models and makes of second-hand cars on sale in the hands of members. A copy of such lists shall be mailed to each member.

Thirteenth—Each member of the association shall render all possible assistance to the association in obtaining this information and shall furnish it with complete lists of all cars on hand for sale.

Fourteenth—Each member after completing a trade for any second-hand car shall immediately report by mail to the association, filling in a blank form, to be furnished by the association, which shall read as follows: "I, today, took a second-hand car, model..... allowing $..... as part payment on a new car. Signed..... Dated....."

Fifteenth—Each member shall make all quotations on second-hand cars to their customers in writing, and shall mail a copy of such quotation, omitting the name of the customer, to the association upon forms to be supplied by the association.

Sixteenth—The association, through its secretary, shall furnish to any of its members, on request, the amount that any dealer has allowed for any second-hand car or any quotation made by any dealer to a prospective customer on any second-hand car, using for this purpose the information obtained from the reports provided for in clauses 14 and 15.

Seventeenth—The expense of obtaining and furnishing the information provided for in the preceding clauses 1-15, shall be divided pro rata among the members of the association dealers in motor cars.

Pullman Owners Tour to Factory

YORK, PA., Nov. 13—The first sociability run of the Pullman Automobile Company, Philadelphia, was held to-day from the Quaker City to York, and fifteen Pullman cars were entered by owners from Philadelphia and Reading.

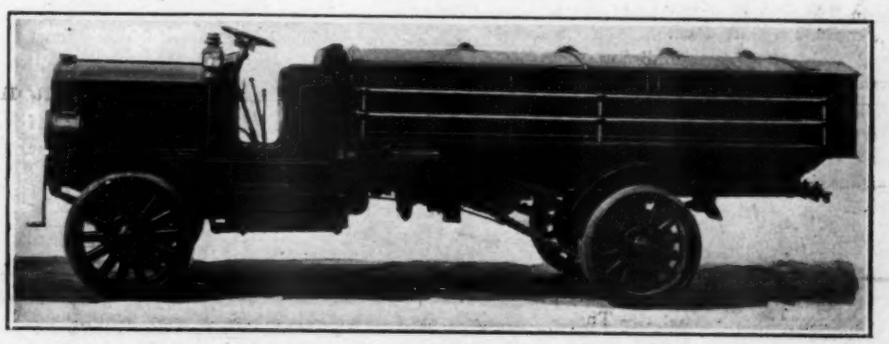
W. L. Garland, driving a 1911 Model K Pullman, won the run. His time for 89 miles was 5:03.30. The time for the run had been fixed at 4 hours, 56 minutes and 10 seconds. Mrs. W. G. Preston, Philadelphia, won the ladies' prize for guessing closest to the elapsed running time. Her guess was 4 hours and 56 minutes. I. S. Cohen, of the Philadelphia Taxicab Company, came within 30 seconds of winning the first prize, he making the distance in 5 hours and 4 minutes. The route was via Paoli, Coatesville, Lancaster, Columbia and York.

The Longest Oil Truck

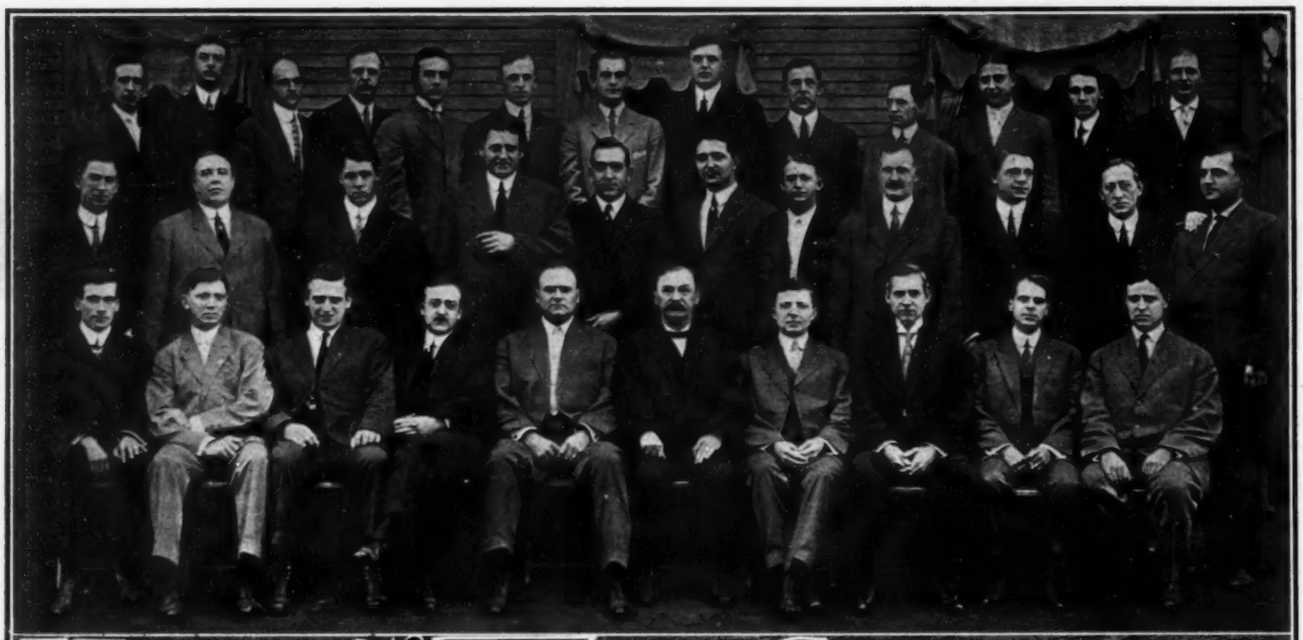
MUCH interest has been shown in a new oil wagon truck recently put into service by the Standard Oil Co. It is a Longest, manufactured by Longest Bros. Co., of Louisville, Ky., it being one of their standard designs with a few alterations to minimize any danger of igniting the inflammable oil which is carried. The large tank is divided into four compartments, each carrying about 250 gallons of oil; the box on the rear carries the measures, funnels, etc.; the brass rails on the sides are designed to carry cases, cans of oil and boxes of grease.

The manufacturers of this truck call it their 3- to 4-ton model. The motor is four-cylinder, four-cycle, 5-inch bore and 5 1-2-inch stroke, 40 A. L. A. M. horsepower. Bosch magneto and Stromberg carbureter are used. The wheel base is 144 inches and the tread 68 inches. The tires used are 36 x 4 on the front and 36 x 4 dual on the rear. The fuel supply for the motor is a 27-gallon tank located under the driver's seat, the gasoline flowing to the carbureter by gravity. The approximate weight of the complete outfit is 7000 pounds.

The design of this truck has been much admired; mechanically it has every appearance of being well and strongly built and its lines are very impressive. The Longest Bros. Co. makes the motors, transmissions, wheels, radiators, and practically all parts used in the truck's construction. The 3-ton truck of standard design sells for $3,500, while the 5-ton vehicle sells for $4,000.



New oil truck built by the Longest Bros. Co., of Louisville, Ky.



NEWS of the WEEK CONDENSED

CONVENTION OF SWINEHART SALESMEN AND BRANCH MANAGERS AT THE GENERAL OFFICES AT AKRON, O.

Top Row, left to right—A. T. Barder, Chas. J. Parker, W. K. Gardner, J. F. Lemmon, G. L. Moore, F. C. Grant, E. Flagg, Jr.; C. A. Swinehart, J. G. Boss, W. E. Boyle, W. J. Kreuder, H. L. Houk, G. A. Dodge. Middle Row—M. J. O'Connor, B. T. Hadley, L. H. Brainard, F. E. Partridge, C. O. Dail, Louis J. Long, Mr. Gray, F. H. Pierce, G. E. Grimes, J. A. Kuehlborn, A. T. Carnahan. Bottom Row—F. D. Wait, E. O. Hoopenganer, J. J. Thompkins, A. J. Green, W. W. Wuchter, R. A. May, C. O. Baughman. C. W. Harris, S. G. Andrews, F. H. Burgher

ST. LOUIS, MO.—Local dealers are in a controversy with the Secretary of State in regard to the legality of the practice of issuing pasteboard duplicates of the dealer's license to purchasers of new cars, for use until the State license has been obtained. The Secretary of State recently announced that any motorist using a pasteboard tag would be subject to arrest and fine. The dealers declare their intention of testing the question in the courts, if necessary.

NEWARK, N. J.—An automobile repair plant will be erected here by Eisele & King.

BOSTON, MASS.—W. V. Bennett is the latest addition to the salesforce of the local Grout branch.

LIMA, O.—The A. D. Maus Auto Company of 114 East Elm street has taken the agency for the 1912 Mitchell.

WASHINGTON, D. C.—The C. B. McAllister Company has secured the Ford agency for Washington county.

AKRON, O.—The Swinehart Tire & Rubber Company of this city will erect a new building next to its present plant.

ST. LOUIS, MO.—Announcement is made that the Mound City Buggy Company is to handle the Jackson in this vicinity.

LEIPSIC, O.—The American Foundry Company of this city has changed its name to the Temco Electric Motor Company.

KANSAS CITY, MO.—The Auburn Motor Car Company has removed to the corner of Sixteenth street and Grant avenue.

BUFFALO, N. Y.—The Thomas Motor Car Company, of this city, has increased its capital stock from $50,000 to $100,000.

NEW YORK CITY—The Poertner Motor Company has taken the agency for the Herreshoff line of small cars for this district.

WILMINGTON, DEL.—The Auto Sales Company, a local concern, has begun the manufacture of a motor truck of its own design.

ST. LOUIS, MO.—The Kisselkar branch, of which George Dunville is manager, has taken new quarters at 3008 South Grand avenue.

MILWAUKEE, WIS.—The Federal Rubber Company of Cudahy, has purchased a site for a new office building, which will cost $18,000.

SAN FRANCISCO, CAL.—W. A. Baker of Seattle, Wash., has joined the forces of Don Lee, the local distributor of the Cadillac.

PITTSBURGH, PA.—The Ohio Motor Car Company of Elmwood - Cincinnati has named the Federal Motor Company as local agent.

RICE LAKE, WIS.—The Automobile Trip Carrier Company will build a 50 x 120-foot brick addition to its factory at once, near the foundry building.

BOSTON, MASS.—The R. L. and H. H. Smith Company, distributor of the Selden cars and the Mais truck, intends to establish a service department.

MONTREAL, CAN.—Scott and Pease have opened a showroom at 632 Saint Catherine street, West. They are agents for the Baker Electric and for the Pope-Hartford.

GRAND RAPIDS, MICH.—The Silverman automobile factory to be built in this city will be two stories high, with basement, and will measure 59 by 100 feet. It will cost $10,000.

MUSCATINE, IA.—Bowman Brothers have enlarged their garage and salesroom on Front street and have contracted with the Buick company for their line for 1912 for Muscatine and Louisa counties.

ROANOKE, VA.—The Virginia Motor Car Company is having plans prepared for the erection of a fireproof garage, 50 by 154 feet. The building will be equipped with a turntable and electric elevator.

MANSFIELD, O.—C. H. Voegele has taken the agency for the Velie car for this vicinity. He is building a large garage for the purpose of handling Velie freight automobiles as well as pleasure vehicles.

WASHINGTON, D. C.—R. C. McDowell, of Miller Brothers' automobile supply house,

has been appointed superintendent of the garage on Church Street owned by the firm.

ALEXANDRIA, VA.—The B. F. Board Motor Truck Company is planning to erect an addition which will increase the capacity of the plant from 200 to 400 trucks a year.

ST. PAUL, MINN.—According to records in the office of the Secretary of State, there are 19,206 automobiles in use in Minnesota. They are valued at approximately $2,000,000.

GALESBURG, ILL.—The firm of Hobbie and Martin has passed into the hands of W. P. Martin who will continue to carry on the business under the name of the Central Garage.

SYRACUSE, N. Y.—The Chase Motor Truck Company, of this city, expects to begin operations in the new 3-story factory addition on Wyoming street about the end of next month.

BOSTON, MASS.—The Hollander Motor Car Company, agent for the Metz car in New England, has moved into its new building on Boylston Street, near Massachusetts avenue.

KANSAS CITY, MO.—The local branch distributing house and service station of the Remy Electric Company has been moved from 416 East Fifteenth street to 509 East Fifteenth street.

SAN FRANCISCO, CAL.—J. D. Anderson, general sales manager of the United States Tire Company, is inspecting the branches which the company has opened on the Pacific Coast during the past few months.

NEW YORK CITY.—American-made tires to the value of $1,715,322 were exported during the first eight months of this year. In August the exports of tires were $251,262, a gain of over $100,000 over August, 1910.

CINCINNATI, O.—Charles C. Craig, formerly connected with the Chicago branch of the Haynes Automobile Company, has assumed the position of sales manager for the Enger Motor Car Company of this city.

KANSAS CITY, MO.—Christian & Company, formerly agents for the Hupmobile and Hupp-Yeats Electric, have been succeeded by the Hupmobile Sales Company of Kansas City. C. C. Christian is manager.

CHICAGO, ILL.—Charles V. Severin, who has been connected with the automobile industry for the past 7 years, has been placed in charge of the service department of the local branch of the Velie Motor Car Company.

CLEVELAND, O.—The F. B. Stearns Company, of this city, has rented the factory of the Royal Tourist Motor Car Company, E. 72nd street and St. Clair avenue N. E., which in future is to be operated as Stearns plant No. 3.

CHICAGO, ILL.—The Lininger Implement Company of Omaha, Neb., will represent the Lincoln Motor Car Works of this city throughout Nebraska and Wyoming. It will act as distributor for the Lincoln light delivery wagon.

AKRON, O.—The Goodyear Tire & Rubber Company of this city will occupy the last of its series of new buildings in three weeks. The latest addition is to be occupied by stock and the shipping department of the company.

NEW YORK CITY—Melvin J. Adams, formerly of the United States Motor Company, has joined the advertising department of the American Locomotive Company. Mr. Adams will assist in the preparation of the Alco literature.

SYRACUSE, N. Y.—A. D. McLachlan, formerly connected with the Royal Tourist Motor Car Company, of Cleveland, O., has resigned and has accepted the position of general sales manager with the Sanford-Herbert Company, of this city.

KENT, O.—The prospects for the building of a new automobile works in the city are very favorable. As soon as enough of the lots have been paid for to warrant building, the Criterion Motor Car Company of Pittsburgh, will erect its factory.

INDIANAPOLIS, IND.—The International Metal Polish Company of this city has broken ground for a new factory. The new building will be of brick, with inside construction of reinforced concrete.

WILMINGTON, DEL.—Elaborate preparations have been made by the Delaware Automobile Association for its annual banquet, which will be held Friday evening at the Clayton House. Covers will be laid for 200 persons.

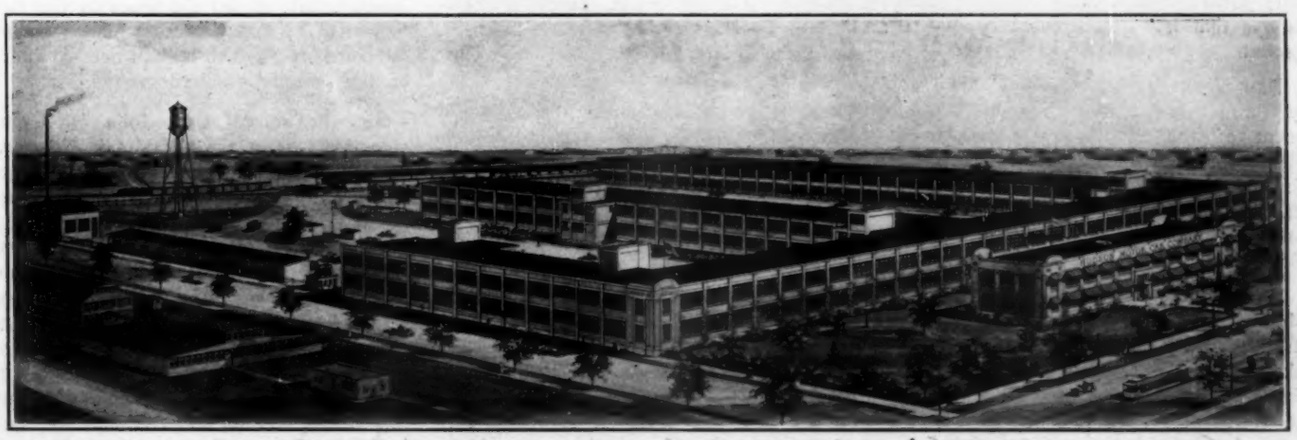
PORTLAND, ORE.—S. C. Houston, associated with the sales force of the White Motor Car Company, has been duly installed as manager, succeeding C. A. Eastman, who will now head the sales force and devote his entire attention to the selling of cars.

CINCINNATI, O.—The Fisher Motor Car Company, successor to the Speedwell Motor Car Company of this city, has leased the modern garage and salesrooms located at 804-808 Sycamore street for 6 years. The lessee is a representative of the Speedwell car.

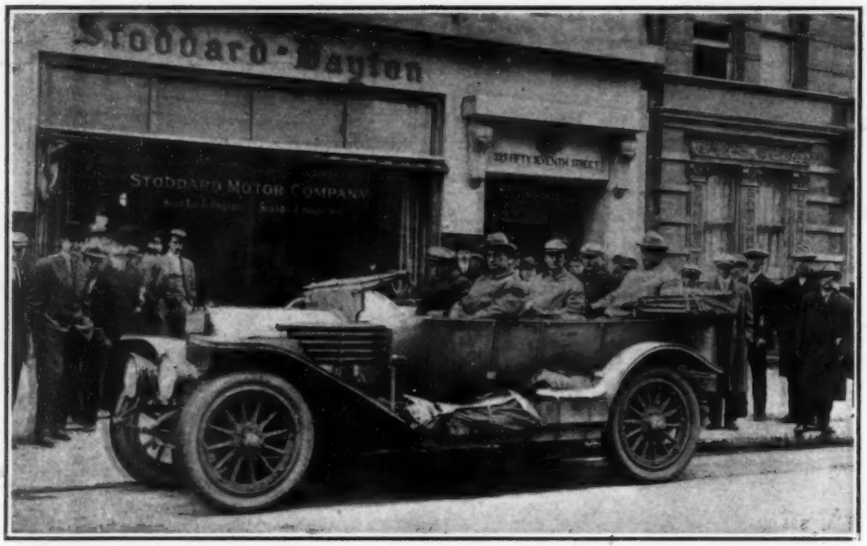
CLEVELAND, O.—Upon the application of the Panama Rubber & Supply Company, the Columbia Refining Company, the Cleveland Auto Top & Trimming Company, and the M. & M. Company, A. J. Schur has been named receiver for the Kissel Kar Company, of this city.

INDIANAPOLIS, IND.—The commissioners of Washington county, Ind., have purchased that part of the toll road running through the county. The road, which has been operated for many years by the New Albany and Paoli Turnpike Company, will become a free turnpike.

RACINE, WIS.—The Holbrook-Armstrong Company of this city is building three chassis from designs by a Chicago concern. Reports that the company will engage in the business of building complete cars are denied although practically all parts are now being made.



New plant now in course of erection on Jefferson Avenue, Detroit, for the Hudson Motor Car Co.



B. O. Tilden's transcontinental Stoddard-Dayton car at the finish of its 26,000-mile tour in the interest of sanitation

INDIANAPOLIS, IND.—Thomas Marshall of Detroit, Mich., has been appointed general manager for the United Motor Indianapolis Company. He succeeds Jack Hayden, who has been obliged to retire on account of ill health.

INDIANAPOLIS, IND.—Suits brought in the federal court here by Thomas J. Lindsay and Willard Harmon against the Cadillac Automobile Company and the Westcott Motor Car Company have been dismissed. Infringement of patents covering a bevel-gear floating type of axle was charged.

CAMBRIDGE, ILL.—P. A. Johnson, who has the Maxwell line for Henry, Stark and Peoria counties for the coming season, will have a garage and salesroom in Peoria for 1912. Mr. Johnson will assume the management of the Cambridge office and devote part of his time to the Peoria office.

AKRON, O.—John W. Thomas, newly-appointed general superintendent of the Firestone Tire & Rubber Company, was inducted into office with a banquet of department heads of the company last week. The position which Mr. Thomas occupies is one that has been created by business growth.

NEW YORK CITY—Albert J. Ditman, who has been connected with the sales department of the Studebaker Company for eight years, has become a member of the firm of the Whiting Motor Company which handles the Cunningham and Mercer cars and the Sandusky motor truck at 1802 Broadway.

ST. LOUIS, MO.—The addition which the Moon Motor Car Company is making to its factory will increase the capacity of the plant 25 per cent., though owing to the fact that the space will be used to relieve the congested departments, it will increase the capacity of the factory, as far as production is concerned, 40 per cent.

BOSTON, MASS.—Fred Harrington, well known in local motor circles, has entered the commercial field and is now a member of the salesforce of the Robert Harrison Motor Truck Company of South Boston.

COLUMBUS, O.—J. A. Sherer, registrar of the Ohio State Automobile Department, has received applications for about 1200 sets of number plates for 1912 registration. Up to date the department has distributed 45,671 sets of number plates for 1911 registration or more than 10,000 ahead of the number given out in 1910.

CLEVELAND, O.—During the past few weeks the F. B. Stearns Company of this city has added the following representative dealers to its list: The Pence Automobile Company of Minneapolis, Minn.; the Fisher-Gibson Company of Indianapolis, Ind., and the McDuffee Motor Car Company of Denver, Col.

INDIANAPOLIS, IND.—The Hoosier Motor Club of Indianapolis has been incorporated. Incorporators named in the charter, which is granted under the voluntary association act without capital stock, are Charles A. Bookwalter, H. O. Smith, Joseph W. Selvage, C. W. Sedwick, N. H. Price, Bert A. Boyd and Homer McKee.

SAN FRANCISCO, CAL.—R. H. Ingersoll has been appointed manager of the Keaton Vulcanizing Works, distributors of Swinehart tires in northern California. For the past few years he has been manager of the Diamond Rubber Company's uptown branch. That position has now been filled by the appointment of J. A. Jones.

LOS ANGELES, CAL.—J. M. Cummings, manager of the western district of the Michelin Tire Company, has opened a sales warehouse at 749 South San Pedro street in this city. Business will be conducted on the wholesale plan. J. C. Wells, formerly of the San Francisco branch, will be in charge.

ANDERSON, IND.—Roy Watts, well known in the gas engine trade, has joined the forces of the Remy Electric Company, of this city, as a special traveling representative. Mr. Watts was formerly power apparatus manager and engineer for the Western Electric Company.

BUFFALO, N. Y.—The Whyland-Nelson Motor Car Company has established its plant at 49-53 Illinois street, this city, where it will manufacture light-weight passenger automobiles with convertible light delivery car attachment. Frank V. Whyland, formerly with the Superior Motor Truck Company, is president and manager.

GENESEO, ILL. — Weimer's Garage has taken the Overland line for part of Henry County. I. N. McBroom has taken on the entire Clark line for all of Henry and part of Mercer counties for the coming season. The Geneseo Garage has made arrangements with the P. W. Kempster Company, of Prophetstown, Ill., to handle part of Henry County on the Buick line.

SYRACUSE, N. Y.—At the annual meeting of the stockholders of the Chase Motor Truck Company, Nov. 8, the following directors were elected: A. C. Chase, A. M. Chase, L. O. Bucklin, H. P. Bellinger and E. C. Witherby. The directors elected the following officers: President, A. M. Chase, vice-president, H. P. Bellinger, and secretary and treasurer, E. A. Kingsbury.

BEAVER DAM, WIS.—E. O. Parker, president of the Waldron Automobile Manufacturing Company, of Waldron, Ill., is negotiating with the Beaver Dam Advancement Association for the removal of the plant to this city. The company manufactures a combination motor car for business and pleasure purposes, farm tractor, stationary engine, etc. Beaver Dam is an agricultural implement center.

WALTHAM, MASS.—The Metz Company of this city has secured another building near its plant—the former home of Gov. Gore of Massachusetts. The general offices have been transferred to this building which will be used as an administration headquarters, giving the space in the factory over to manufacturing. Next spring the company plans to build a new structure on the recently acquired ground.

SAN FRANCISCO, CAL.—John H. Eagal, vice-president of the Oldsmobile Company of California and manager of the Oldsmobile branch in Los Angeles, has been appointed general Pacific Coast representative of the Olds Motor Works, of Lansing, Mich., and manager of the new San Francisco branch. David L. Whitford has been transferred from San Francisco to Los Angeles, where he will be in charge of the Southern California territory. Eagal's district will be California, Oregon, Washington, Idaho, Nevada and Arizona. W. Folberth, the Oldsmobile factory engineer, will make his headquarters in San Francisco.

BALTIMORE, MD.—Since Commissioner of Motor Vehicles John E. George took office a net fund from motor car licenses has been turned over to the State treasury. One-fifth of this amount goes to the city of Baltimore and the remainder to the various counties for oiling, maintaining and repairing modern roads being built throughout the State.

COLUMBUS, O.—The Ohio State Automobile Department is preparing to move from the Harrison building on High street to the New Hartman building, corner of State and Third streets. Several rooms have been leased on the third floor for the executive and bookkeeping offices and a room on the ground floor will be used as a shipping-room for the number plates. The department will be moved about December 1.

NEW YORK CITY—The Packard Motor Car Company, of Detroit, has sold $2,000,000 5-year, 5 per cent. notes, maturing Dec., 1916, to W. A. Read & Company. These notes are a first claim on the assets of the company, which are carried on the books at over $15,000,000. The purpose of the company in selling these notes was to retire bank loans incurred in financing development and expansion work, and to provide additional working capital.

BOSTON, MASS.—Manager Harold D. Bornstein, of the New England branch of the Velie, has arranged to move about January 1 from his present quarters on Massachusetts avenue to a building on Boylston street, now being remodeled. The lease of the present quarters does not expire until next September, but as the Stoddard-Dayton Company is to take it over Manager Bornstein decided it would be a good plan to move as soon as possible.

BOSTON, MASS.—The local branch of the Velie Motor Car Company has appointed the following as agents for the Velie: The Shean Auto Station for Springfield, Mass., and vicinity; Amos J. Shorey for Bangor, Me., and northern Maine; J. T. Curtiss & Company for Hartford, Conn., and southern Connecticut; George H. Snell for Attleboro, Mass., and vicinity; Arthur Beharrell for Lowell, Mass.; Walter B. Johnson for the State of Vermont; Lord Bros. for Tifton, N. H., and vicinity.

BOSTON, MASS.—Manager Pruden of the New England branch of the Kissell Kar Company has approved plans for a new building to be erected for the company on Commonwealth avenue. It will be two stories in height and 200 feet long, giving ample room for salesrooms and a service depot. While the new building is being erected the branch will move temporarily to the motor mart in Park Square, as the J. W. Maguire Company, agent for the Pierce Arrow cars, located next door, has leased the present quarters of the Kissell Kar Company as an addition to its salesrooms.

Automobile Incorporations

AUTOMOBILES AND PARTS

BROOKLYN, N. Y.—Bedford-Bergen Auto Exchange; capital, $25,000; to manufacture machinery for automobiles. Incorporators: Ralph Brown, Max Keve, Chas. Goldstein.

BOSTON, MASS.—White, Binford & Robenson Motor Co.; capital, $20,000; to manufacture automobiles. Incorporators: Albert C. White, Jr., Cecil P. Robenson, Henry O. Cushman.

BUFFALO, N. Y.—Whyland-Nelson Motor Car Co.; capital, $10,000; to make automobiles and engines. Incorporators: Frank W. Whyland, Joel W. Nelson.

CHARLESTON, S. C.—Kanawha Auto Truck Co.; capital, $50,000; to build and sell freight automobiles. Incorporators: W. S. Roberts, J. L. Sydenstricker, George F. Gates, D. S. Gunther.

COLUMBIA, S. C.—Consolidated Auto Co.; capital, $5,000; to sell automobiles. Incorporators: J. B. Roddey, John J. Cain and others.

COLUMBUS, OHIO—Union Sales Co.; capital, $500,000; to manufacture automobiles.

MARION, IND.—Auto Machine Co.; capital, $10,000; to make and repair automobiles. Incorporators: G. D. Lindsay, B. A. Tong, R. E. Breed, Jr.

PITTSBURGH, PA.—Large Motor Truck Co.; capital, $25,000; to manufacture freight automobiles. Incorporator: Edwin L. Atkinson.

PITTSBURGH, PA.—R. C. H. Auto Co.; to sell automobiles. Incorporator: Kenneth S. Burley.

PITTSBURGH, PA.—Krupp Motor Co.; capital, $250,000; to make automobiles and engines of all kinds.

ROME, GA.—Seay-McCartha Automobile Co.; capital, $3,000; to sell automobiles. Incorporators: S. R. McCartha, R. M. McCartha, John L. Seay.

ST. LOUIS, MO.—Mack Motor Truck Co.; capital, $25,000; to make freight automobiles. Incorporators: William R. Bush, Frank J. Bush, Knox Taussig.

SEWAREN, N. J.—Motor Vehicle & Marine Construction Co.; capital, $15,000; to make automobiles. Incorporators: Henry E. Acker, Albert B. Boynton, William C. Muir.

SPRINGFIELD, MASS.—Western Massachusetts Cadillac Co.; capital, $10,000; to sell automobiles. Incorporators: Edward R. Clark, Robert A. Knight.

SYRACUSE, N. Y.—Francis Motor Sales Co.; $5,000; to sell automobiles. Incorporators: Guy M. Francis, Richtmeyer Hubbell, Chas. E. Nichols.

NEW YORK CITY—Volkmar Auto Starter Co.; capital, $20,000; to manufacture automobile starting devices. Incorporators: Bernhard Volkmar, Edward Giegerich, Wm. H. Giegerich.

AUTOMOBILE GARAGES AND ACCESSORIES

BALDWIN, N. Y.—Baldwin Garage; capital, $1,000; to conduct a general garage business. Incorporators: Charles H. Southard, Mary A. Southard, Wilford S. Southard.

BIRMINGHAM, ALA.—Auto Tire & Cycle Co.; capital, $2,000; to manufacture automobile tires. Incorporators: Reese Stansel, W. R. Grimes.

BRADDOCK, PA.—Miles Motor Tire Spring Co.; capital, $200,000; to make automobiles and trucks. Incorporators: Chas. W. Dressler, Thomas G. Aten, Chas. L. Balsyer, Zenob A. Delwart, Fred Miles, M. R. Myers.

CHICAGO, ILL.—Motor Service Corporation; capital, $10,000. Incorporators: R. Oehmig, F. B. Burl, F. R. Page.

CINCINNATI, OHIO—Fisher Auto & Service Co.; capital, $30,000; to deal in automobiles, trucks, garages, accessories and to do a general garage business. Incorporators: Arthur F. Fisher, H. J. Guckenberger, George C. Bauer, George Guckenberger, William J. Fleming.

CONNEAUT, OHIO—Trio Horn Mfg. Co.; capital, $25,000; to manufacture automobile horns and other accessories. Incorporators: Ira E. Stump, B. E. Thayer, W. A. Middleton, Fred Eckert, F. B. Kavanaugh.

INDIANA HARBOR, IND.—Central Auto Supply Co.; capital, $600; to deal in automoible supplies and accessories. Incorporators: C. C. Robinson, F. E. Stephens, B. S. Gardner.

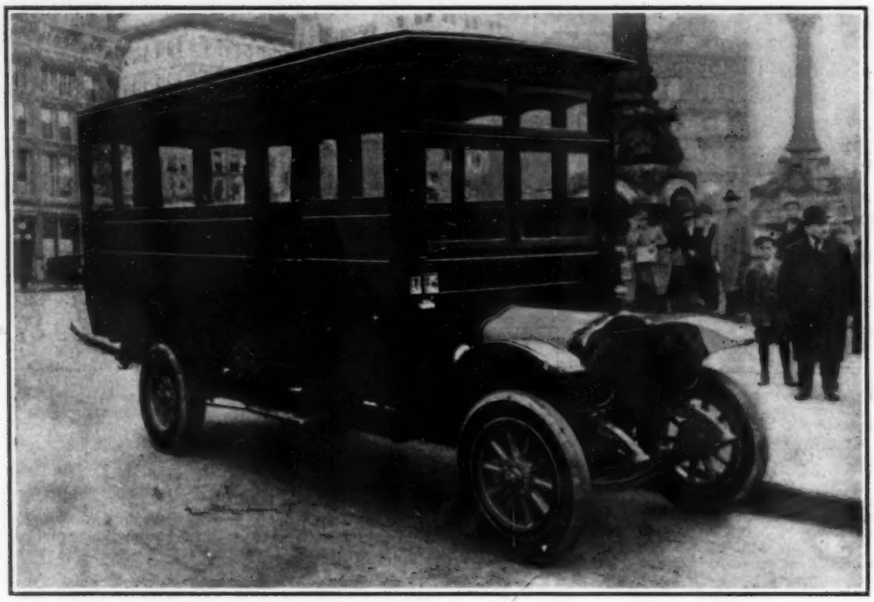
NEW YORK CITY—Advance Motor Express Co.; capital, $5,000; to rent automobiles, express and transfer wagons. Incorporators: H. S. De Camp, H. L. Graft, J. I. Doherty.

NEW YORK CITY—Trautman Air Rubber Tube Co.; capital, $100,000; to manufacture automobile tires. Incorporators. Ira Trautman, August V. Denis, Wm. G. Newhall.

NEW YORK CITY—Automobile Sundries Co.; capital, $10,000; to make and sell automobiles, accessories and supplies. Incorporators: Geo. F. Merritt, John E. Waltz, Thos. M. Crisp.

Building of the Pence Automobile Co., Stearns-Knight distributors in Minneapolis

OF INTEREST to the INDUSTRY



Type of pay-enter motor bus made by the White Company for Indianapolis company

INDIANAPOLIS, IND.—The Rapid Transit Motor Company has begun the operation of a motor bus line on North Meridian street, one of the finest residence districts in the city. The chassis of these vehicles are of the 1½-ton class made by the White Company, of Cleveland, O. The buses are of the pay-as-you-enter type, seating eighteen passengers each. They are provided with electric fans for summer service, while a heating system is installed for winter use. The route they will cover is 3½ miles long, and each fare is 10 cents.

PONTIAC, MICH.—The Welch Motor Car Company will begin work at once on an addition to its factory. It will measure 40 x 100 feet.

JEFFERSON, WIS.—Ground has been broken here for the new plant of the Kenzler-Waverley Motor Company. It is to be 60 x 100 feet.

JERSEY CITY, N. J.—The Autoparts Manufacturing Company has removed from 56 Pine street, New York, to 810 West Side avenue, in this city.

DETROIT, MICH.—Joseph E. Warren has been appointed chief of district managers for the Metzger Motor Company of this city which manufactures the Everitt car.

HAMILTON, ONT.—The Republic Motor Car Company has completed foundations for two factory buildings to measure respectively 60 x 300 feet and 80 x 100 feet.

ST. LOUIS, MO.—The General Novelty Company, manufacturer of Bullfrog horn reeds, has removed to Twenty-third and Locust streets, with the Auto Parts Sales Company.

PHILADELPHIA.—Ballinger and Perrot, architects, are preparing plans for a $100,000 automobile factory which the Otto Gas Engine Company contemplates erecting at Mount Holly.

ANDERSON, IND.—The Remy Electric Company of this city has purchased the plant and patents of the R. G. Peters Company of Grand Rapids, Mich., and the Peters plant will be consolidated with the one here.

INDIANAPOLIS, IND.—The American Motors Company has moved part of its factory organization into the new building at Meridian street and Belt railroad in this city. All the buildings previously occupied are retained.

DETROIT, MICH.—The Metzger Motor Car Company, which makes the Everitt car, is rapidly pushing to completion the addition to its factory. The building will be finished and ready for occupancy within the next 30 days.

TOLEDO, O.—The Champion Spark Plug Company of this city has purchased a 1 1-2 acre building site on the Lake Shore and Michigan Central Railroad and is constructing a modern, fireproof plant. The company has also placed orders for a large addition to its automatic machinery equipment.

AKRON, O.—The Goodyear Tire & Rubber Company, closed for three weeks to make changes in equipment and prepare for the Winter season of 1912, resumed operations Nov. 1, with 2,500 men. Officers of the company say the busiest season in the company's history is at hand. The recent improvements and additions give 1,000,000 feet of floor space for use in the new campaign.

ST. LOUIS, MO.—The new pumping station to be erected in this city by the Prest-O-Lite Company will occupy a site 180 x 475 feet on the south side of Duncan avenue, between Vaudeventer avenue and Sarah street. It is the intention to have the St. Louis station take care of the middle and southwestern territory in repairing and recharging gas tanks.

SYRACUSE, N. Y.—Robert M. Barker has been made advertising manager of the Chase Motor Truck Company of this city. Mr. Barker is a graduate of Harvard, has traveled widely and his experience in the advertising field has been extensive.

OOSTBURG, WIS.—The Yale Mfg. & Sales Company, Manufacturers' Home building, Milwaukee, which manufactures automobile accessories and signal devices, has purchased the buildings and real-estate of the Oostburg Foundry Company, and will move its manufacturing plant to this place. The general offices will remain in Milwaukee.

MOLINE, ILL.—Benefits amounting to $1614 were paid out during the last fiscal year by the Velie Employes' Aid Association, according to the treasurer's report at the annual meeting of the society. Benefits were paid to 115 members of the association, which is composed of 300 employes of the Velie Carriage and Velie Motor Vehicle Works.

WAKEFIELD, MASS.—At the regular town meeting held this week a special committee appointed to investigate motor apparatus for fire departments sent in its report that a combination chemical and ladder truck costing $5800 should be added to the town's fire equipment. It is to be kept at the central station. The town now has a motor chemical and a motor hose wagon. The committee's report will be accepted.

WASHINGTON, D. C.—The Pope Automobile Company, agent for the Pope-Hartford, Columbus Electric and Marathon, is making extensive improvements in its salesrooms at 817-19 Fourteenth street, N. W.

CHARLOTTE, S. C.—The Diamond Rubber Company, of Akron, O., has opened a subbranch under the temporary direction of J. F. Banier.

PATENTS GONE TO ISSUE

CONTROLLING MECHANISM—A steering wheel for operating steering knuckle and carbureter throttle.

5. The patent refers to a mechanism as shown in Fig. 1, comprising the combination of a steering-post with a rotatable shaft for controlling the movement of the carbureter throttle. This shaft is rotated through an oscillating lever arm. A rotatable shaft serves to actuate the spark-controlling device, and a hand grip carried on the upwardly extended axis of the rotatable lever abovementioned to rotate the shaft. The hand grip may be made to operate the lever which moves simultaneously with it, while it is capable of being rotated on its axis independently of the movement of the lever arm.

No. 1,007,673—To Howard E. Coffin, assignor to E. R. Thomas Detroit Company, Detroit, Mich. Granted November 7, 1911; filed August 4, 1906.

LIQUID FUEL ENGINE—In which the crankcase serves as a compression chamber for air.

1. This engine (Fig. 2) consists of a cylinder and a casing secured thereto to form a crankcase, which is provided with an inlet valve. A piston rotating in the cylinder compresses air in the crankcase, which communicates with the cylinder through a pipe containing an evaporator. This is heated by the hot gases exhausted from the cylinder. A metal gauze net is inserted in the pipe, between crankcase and evaporator, and the pipe is provided with a pit forming part of the channel between the metal gauze and the evaporator to collect waste fuel from the latter.

No. 1,008,199—To Olaf Leonhardt Riegels, Christiania, Norway. Granted November 7, 1911; filed February 16, 1909.

INTERNAL-COMBUSTION MOTOR—Cylinders are in opposed position and each pair served by common means.

2. The patent relates to a multi-cylinder engine (Fig. 3) consisting of a base, a number of cylinders arranged in pairs with each two cylinders of a pair in angular relation, a crankshaft in the base with a single throw for each pair of cylinders and means for actuating the valves of the engine cylinders. These means are: a camshaft which is journaled on the casing between the cylinders of the pairs parallel to the shaft and a cam on the camshaft for each pair of cylinders. A cover is detachably secured on the casing over the camshaft and has guide apertures parallel to each cylinder in the plane of rotation of the cam provided for it. A finger is provided whose inner end is journaled in mating half-bearings formed in the meeting faces of the cover and base, and whose outer end bears on the camshaft in the plane of rotation of the cam; there is one valve tappet-rod for each cylinder, and it is adapted to reciprocate in the guide parallel to the cylinder. A plunger for a companion cylinder is reciprocable in the companion guide aperture of the cover with its inner end resting on a finger between the ends thereof.

No. 1,007,842—To Ellsworth H. Belknap and John W. Swartz, Detroit, Mich., assignors to Golden, Belknap and Swartz Co., Detroit, Mich. Granted November 7, 1911; filed September 15, 1910.

ACETYLENE GENERATOR—A system applicable to the generation of large quantities of acetylene gas.

3. The apparatus protected by this patent (Fig. 4) comprises an acetylene generator in which is mounted a carbide holder having an outlet, the generator being connected with a gas tank in which a gas-bell is mounted free to slide. Close to the outlet mentioned a shutter is mounted and able to swing freely, thus being adapted to control the flow of carbide through the outlet. A pair of link devices in the generator which are jointed together at their lower ends have their upper ends connected to the shutter so as to swing the same. A lever is provided which has a slotted end adjustably connected with the gas bell and controlled thereby, and this lever is connected to the upper end of the two link devices by another link, this latter link swinging on the upper end of the two link devices during the movement of the gas-bell and lever after the shutter has reached the end of its swinging movement.

No. 1,007,909—To Joseph O. Angermeier, Inglefield, Ind. Granted November 7, 1911; filed April 15, 1910.

LIFTING JACK—In which a piston is lifted by means of a fluid under pressure.

2. This jack is a combination of a lower chambered member with a vertical cylinder containing a piston on which a prop is seated. The prop is normally held yieldingly in an upright position, but may be swung down when required. Means are provided to center the lower end of the prop on the piston and for admitting an actuating fluid into the chamber below the piston.

No. 1,008,138—To George C. Hale, Kansas City, Mo. Granted November 7, 1911; filed June 3, 1911.

CLUTCH—Being of the cone type.

This clutch comprises a drive-shaft to which is secured a clutch member provided with a rim carrying studs. The stem of the shaft carries a spring seat. The driven clutch member has a sleeve and is mounted on the drive-shaft stem; its rim carries pins. A spring surrounds the drive-shaft stem between the driven member and the spring seat. The sleeve mentioned is encircled by a collar having radial arms provided with perforations which receive the pins on the rim of the driven clutch member. Means are provided for shifting the collar so as to engage the radial arms with or disengage them from the studs on the rim of the clutch member of the drive shaft.

No. 1,007,977—To Earle T. Robinson, St. Louis, Mo. Granted November 7, 1911; filed October 22, 1910.

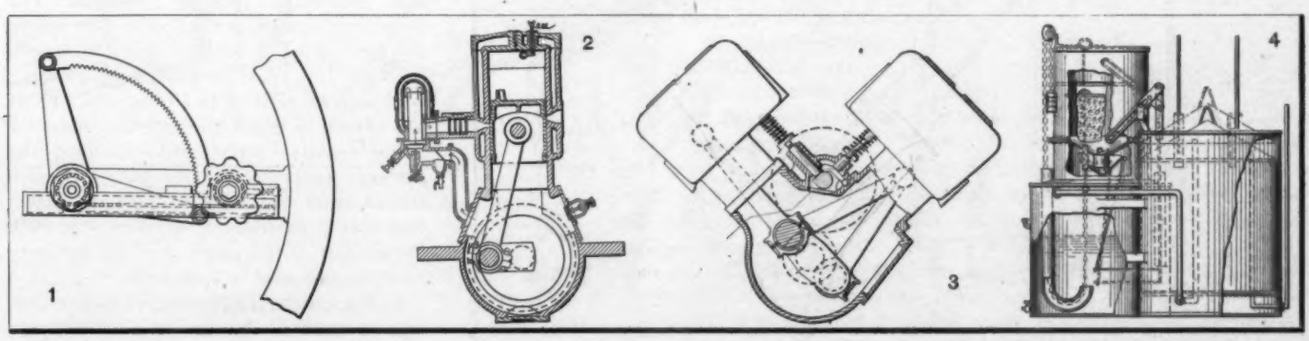


Fig. 1—Coffin steering mechanism. Fig. 2—Riegels' liquid fuel engine. Fig. 3—Belknap-Swartz motor. Fig. 4—Angermeier acetylene generator

Newest Ideas Among the Accessories

Turner Gasoline Torches

BLOW torches, as illustrated in Figs. 1 and 2, are used to produce such hot gasoline-air flames as are of use in brazing, tempering, annealing and melting work, not forgetting welding and soldering jobs. The apparatuses here shown are made by the Turner Brass Works, Sycamore, Ill. The devices consist of seamless steel tanks, into which a sufficient quantity of the fuel is filled. Then the space above the level of the liquid is filled with compressed air by either working the pump attached to the smaller types of torch, or connecting the air inlet of the tank with a source of compressed air. After the pressure of the air inside the tank has reached a sufficiently high degree, as indicated by the gauge accompanying the torch, the air inlet valve is closed, and the apparatus is ready for operation.

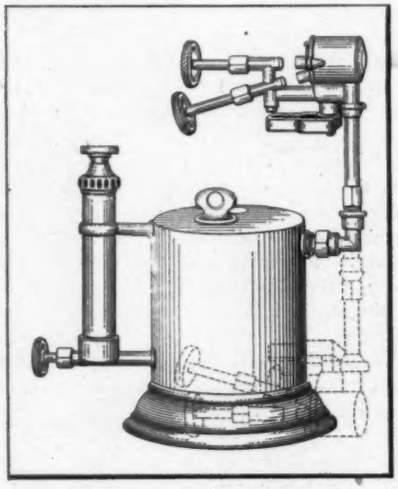


Fig. 1—Blow torch designed for use of gasoline

If the outlet of the tank is opened by means of the proper valve, the gasoline or kerosene used as fuel is pushed out of the tank at a high rate of speed and if lighted provides a hot flame. The machine shown in Fig. 1 is intended for the use of gasoline only, and a double jet is used in it for producing the very high temperature required for the work. It is claimed that this type of torch will do the work of a common blowtorch in half the time consumed by the latter.

In Fig. 2 is illustrated the Turner hot-blast brazing machine No. 68A, which is built for the use of either gasoline or kerosene. The principle of construction and operation of this machine are identical with those of the smaller type, to which it is very much superior, however, as far as capacity is concerned. The large size may burn at full blast for 5 hours, without pausing or refilling. One feature distinguishing it from the smaller machine is the use of two burners connected to the tank by oiltight, copper-covered tubing attached to two valves on the top of the tank. Either valve may be used independently or in unison with the other, giving one or two very hot flames.

Fig. 2—Turner hot-blast brazing machine in which either gasoline or kerosene is used

Langrehr Safety Device

The Langrehr explosion-safe fuel receptacle shown in Fig. 3 is constructed with the object of protecting gasoline or similarly combustible fuels in a can from spontaneous combustion which might arise by the admittance of a flame into the inner space of the receptacle. Broadly speaking, the principle of the Davy lamp has been utilized in this device, but has undergone considerable modifications, before it was found available for efficient service. In the Davy lamp a wire-mesh screen is used to separate the flame from the explosive gases which otherwise would have free access to it. Should such gases enter the lamp through the screen and ignite, they will be prevented from firing back out of the lamp space by the cooling effect of the wire-gauze screen.

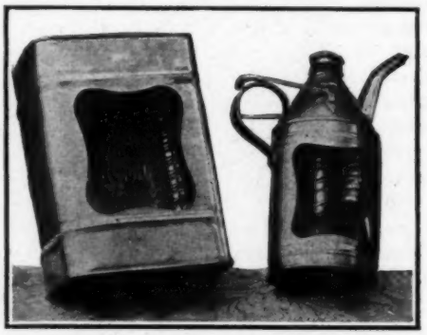


Fig. 3—Langrehr safety fuel receptacle

In the Langrehr device the number of openings in the partition between flame and fuel is reduced, thus impeding the progress of the flame to a much higher extent than a wire screen; the increased metal surface provides an augmented cooling effect.

As Fig. 3 shows, the Langrehr device consists of a series of corrugated and smooth strips of metal of suitable strength and elasticity, forming passages. The metal strips series are rolled in tube shape. By the use of a tube of suitable length, the total free cross section of the passages is almost equal in area to the aperture of the vessel, to which the tube is connected.

The massive metal strips forming the passages cool the burning gases, if such should enter the tube, to such an extent that it is impossible for the flame to reach the interior of the vessel in which the combustible substance is contained.

The American representative of the German inventor of this device is Dr. Edward D. Feldman, Berlin Chemical Laboratories, 560 West 171st street, New York City.